



The Alberta Journal of Educational Research

Volume XIX, No. 2

June, 1973

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Students' Self-Selection of Examination Dates: A Preliminary Investigation

Undergraduate students enrolled in a Developmental Psychology course were given the opportunity to take the final semester examination on one of four dates. Students were responsible for all course content irrespective of the date they chose to write the exam. Significant positive interrelationships were discovered between the students' previous overall average, their choice of exam dates, and their examination grades. Significant mean differences between exam scores revealed that the earlier the test was written, the higher the grade attained. The data tentatively suggest that university residential requirements should be made to vary with the academic abilities of the students.

Universities have long required that a specific residential period of time must pass before a student is awarded an undergraduate degree. As a result, academicians have become all too familiar with the labels "Freshman", "Sophomore", "Junior", and "Senior" (or, in the case of universities within the province of Ontario, years I, II, and III). The lock-step approach to education that is typically found in today's universities may be providing the average student with a favorable learning environment. However, many university students are not "average" with regard to such educationally relevant variables as achievement motivation (McClelland, 1961) level of aspiration (Harrison, 1969), test anxiety (Kestenbaum & Weiner, 1970), and general academic ability. Unfortunately, the existent university system seems to have neglected these latter students who vary from the average on one or more of the above traits.

Perhaps one way in which universities can better serve all students would be to adopt a "self-paced" studies format. Such a format would be aimed at meeting individual variations in ability and speed of learning, level of aspiration, and other educationally relevant behaviors and motives. One manner in which the feasibility of such a program may be tested would

be to allow students to make their own selections of their final examination dates. By so doing, students could make personal decisions regarding the fulfillment of academic requirements.

Thus, the purpose of this study was to examine the effects of students' self-selection of examination dates on their subsequent academic performance. Two hypotheses were tested. First, it was postulated that students who had done well in the past, relative to other students in the class, would choose to take the final examination earlier than their less academically inclined peers. Psychological studies have revealed that the levels of aspiration and self-confidence of university students may be raised or lowered dependent upon their previous academic performances (Child & Whiting, 1949; Festinger, 1942; Hill & Dusek, 1969). In general, the findings have indicated that past academic success leads to the establishment of academic self-confidence and a raising of the level of aspiration, whereas past failure leads to the reverse. Thus, it was predicted that students who had been academically successful in the past would have a confidence level or level of aspiration, such that they would choose to finish the course requirements at an early date.

Previous investigation has also revealed a positive relationship to exist between achievement motivation and academic success (Kestenbaum & Weiner, 1970; McClelland, 1961). This finding provided the basis for the second hypothesis. A positive relationship was predicted to exist between the dates the examinations were taken and the grades attained on the examinations. Students who took the examination earlier were predicted to fare better than their peers who took the examination at a later date.

Method

Subjects

The subjects were 128 female and male undergraduate students enrolled in an Introductory Developmental Psychology course at the University of Windsor. The subjects were predominately in years II and III (Junior and Senior students) of a three year university program.

Procedure

The students' overall past grades were obtained from their university transcript. To convert students' letter grades into a numerical value the procedure presented below was followed:

A+ = 10 (87% and above); A = 9 (83-86%); A- = 8 (80-82%);

B+ = 7 (76-79%); B = 6 (70-75%); C+ = 5 (65-69%);

C = 4 (60-64%); D+ = 3 (55-59%); D = 2 (50-54%); F = 1 (49% and below).

During the first week of class the students were informed that they would be able to take the final semester examination on one of four dates. The first three examinations were held during the last six weeks of a twelve week semester. A two week interval separated each of the examination dates. The fourth examination was held during the week following the third date.

A list of eleven essay questions and a comprehensive reading list were distributed during the first week of class. Students were informed that they would be responsible for all material and all examination questions regard-

less of the date they chose to write the examination. They were also informed that once they had taken the test, they no longer had to attend class (although class attendance was always optional).

One month into the semester the students were asked to submit their choice of examination dates to the professor. Those choosing the first date were accorded a score of 4; the second date, 3; the third, 2; and the final date, 1. Two of the eleven essay questions were chosen at random for each examination date. Objective grading criteria were prepared before final marking. Interjudge reliability was assessed by having two readers individually grade twenty-five examinations. The correlation coefficient was .96.

Results

A Pearson product-moment correlational analysis revealed a significant positive relationship to exist between the students' overall past grades and their choice of examination dates ($r = .40$, $p < .01$). Furthermore, an analysis of variance calculated for mean overall grade average by choice of examination dates was highly significant ($F = 5.89$, $df = 3/124$, $p < .001$). Previous overall grade means and standard deviations are presented in Table 1. The data indicated that the earlier the test was written, the higher the students' previous grade average.

TABLE 1
MEANS AND STANDARD DEVIATIONS OF STUDENTS' PREVIOUS
OVERALL GRADES

	Date			
	1	2	3	4
$\bar{X}$	6.50	6.67	5.51	4.75
SD	1.00	1.37	1.47	1.48
N	8	14	78	28

Correlational analysis also revealed that a significant positive relationship existed between the date of examination and the grade attained by students ($r = .49$, $p < .01$). An analysis of variance computed for grade means on the four examination dates produced significant results ($F = 4.81$, $df = 3/124$, $p < .01$). Follow-up "t" tests revealed significant mean grade differences between dates 1 and 2 ($t = 3.41$, $p < .01$), dates 1 and 3 ($t = 3.07$, $p < .01$), dates 1 and 4 ($t = 4.94$, $p < .001$), dates 2 and 4 ($t = 4.99$, $p < .001$), and dates 3 and 4 ($t = 4.66$, $p < .001$). Grade means and standard deviations are presented in Table 2. The data reveal that the earlier the test was written, the higher the students' mean grade on the test.

Discussion

The purpose of this study was to examine the relationship of university students' self-selection of examination dates with their previous and subsequent academic performance. It was hypothesized that those students

TABLE 2
MEANS AND STANDARD DEVIATIONS OF TEST SCORES
(Maximum Score = 36)

	1	2	3	4
$\bar{X}$	33.69	27.07	24.85	20.59
SD	1.54	3.64	4.92	7.25
N	8	14	78	28

who had been academically successful in the past would choose to take a final examination earlier than those who had not done as well previously. Secondly, it was hypothesized that a positive relationship would exist between the dates the examinations were taken, and the grades attained on the examinations. Both hypotheses were significantly supported.

A comparison of mean scores on the four different tests revealed that students, through their own selection of examination dates allocated themselves into three distinct groups. The superior group ($N = 22$) took the examination on either of the two earliest possible dates and received a grade average of 81 percent (A-). The average group of students ($N = 78$) chose to take the examination on the third date and received an average grade of 69 percent (C+). Finally, the below average group ($N = 28$) took the examination on the last date and received an average of 56 percent (D+).

The results indicated that a number of factors may have been responsible for the students' choice of examination dates. One probable determinant of examination choice seems to have been previous academic performance. It may have been that receiving good grades in the past was highly reinforcing for the student and, thus, may have functioned to give students confidence regarding their own academic abilities.

Support for this interpretation stems from the high positive correlation found to exist between the students' previous overall grades and the date on which they chose to write the examination. Further support for this notion derives from the aforementioned studies of level of aspiration (Child & Whiting, 1949; Festinger, 1942; Hill & Dusek, 1969).

Another possible interpretation of the students' choices of examination dates may be that brighter students are more highly achievement oriented and less prone to test anxiety (Kestenbaum & Weiner, 1970; McClelland, 1961). As a result, these students might wish to fulfill required tasks earlier. The data indicated that those students who chose to write the final examination during either of the first two dates had grades that were academically well above average in the past. Moreover, those students did, in fact, appear to master the course content earlier and much more successfully than their peers. On the other hand, students who had done poorly in the past may have been rather anxious about taking the examination, thereby trying to delay their taking the test for as long as possible.

In conclusion, average and superior students appeared to have fared well through self-selection of examination dates. Those students who did

poorly, however, may have required a longer period of time in which to prepare for this particular examination. Thus, the results of this study tentatively suggest that university residential requirements should be made to vary with the academic abilities of the students.

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The Effects of the Technical Education Act 1919-1929

The Technical Education Act may be "of significance in the growth of vocationalism in twentieth century Canadian education", as Stamp says. It is also significant in that it demonstrates what can happen when the Federal Government attempts to impose a system of education on the Provinces without adequate study and without the constitutional power to enforce its program.

In an article in the *Canadian Historical Review* of December, 1971 entitled "Technical Education, the National Policy and Federal Provincial Relations in Canadian Education, 1899-1919,"¹ Robert M. Stamp, Associate Professor of Education at the University of Calgary, stated that the Technical Education Act of 1919 was an outcome of the National Policy. The National Policy was designed to encourage the growth of Canadian industry. Industry, however, required skilled labour so that shortly after the inauguration of the protective tariff in the federal budget of 1879 agitation began for the provision of skilled workers through a program of technical education at the high school level. Both the Canadian Manufacturers' Association and the Trades and Labour Congress pressed the Federal Government for action during the first decade of the twentieth century, but Prime Minister Laurier was not convinced that the Federal Government had the power to enact legislation in the area of education. It was not until 1910, at the urging of Mackenzie King, Minister of Labour, that Laurier agreed to a Royal Commission to study the question of technical education. The Royal Commission on Industrial Training and Technical Education (the Robertson Commission) reported in 1913 recommending federal support for technical education. Sir Robert Borden (who had defeated Laurier in 1911) was in power at this time. Although he had previously spoken out in favour of federal support for technical education, he took no action on the recommendations of the Royal Commission until 1919 when his government introduced the Technical Education Act.

Stamp concluded that the Act was "of significance in the growth of

vocationalism in twentieth century Canadian education.”² The Act, however, failed to accomplish its goals and the reasons for this may prove to be equally significant to the future of Canadian education. The legislation was designed to encourage the provinces to establish courses and schools for technical education. The underlying assumption was that each province ought to be able to provide its students with an equal opportunity to learn a trade or skill. In practice the legislation did not encourage many of the poorer provinces to make any significant improvements in their facilities for technical education. Furthermore, the lack of industry in some provinces led them to believe there was no need for technical education. As a result, students in some provinces had much less opportunity to learn a skill or trade than in others.

The Act was the first attempt by the federal government to enter the field of technical education. In drawing up the Act, the federal government had no previous Canadian experience to look to except perhaps the Agricultural Instruction Act, 1913 which it seems to have ignored. Furthermore, in some provinces little if anything had been done in the way of technical education, and the feeling was that there was no real need for any action along the lines proposed by the Federal Government. In short, the program lacked funds, adequate administration, and expertise.

The chief roadblocks to the smooth functioning of the legislation were the lack of funds and the method by which they were allotted; the inadequate supply of properly qualified teachers; the lack of sufficient administrative staff; and the constitutional restrictions on the staff. The Robertson Commission recommended that a total of \$3,000,000 be set aside over a ten year period for technical education. Although adopting many of the other Commission's recommendations, the federal government only gave one-third of the recommended amount despite the Deputy Minister of Labour's statement that “in 1913 . . . the value of the dollar was much higher in relative value than in 1919 . . .”³

Prof. L. W. Gill, the Director of Technical Education, noted that

The increased cost of building and of equipment will no doubt adversely affect . . . development as it will present an insuperable difficulty to some of the smaller towns and cities. As an illustration . . . for a city with a population of 50,000 the cost of building and equipping a technical school to meet ever present needs will exceed \$200,000. Yet the total amount available from the federal grant last year (1919-20) for the largest of the western provinces was only \$51,832.⁴

Prof. Gill concluded that:

To assist in overcoming this difficulty it may be necessary for the Federal Government to aid the provinces on the more liberal scale recommended by the Royal Commission.⁵

The distribution of the funds worked to the disadvantage of the poorer provinces. According to the terms of the Act, “payments from the federal grant are to be made only on condition that an equal amount is expended on technical education by the Provincial Governments.”⁶ This meant that provinces such as Nova Scotia, which underwent a severe economic depression during the decade of the 1920's, were unable (although perhaps willing) to take full advantage of the federal grants. According to the Deputy Minister of Labour, “the only reason (Nova Scotia) has not been

able to place technical education on a proper basis is solely because of the prolonged hard times that have prevented her and the municipalities from securing enough revenue to balance modest public programs of expenditure."⁷

The report continued:

The majority of her (Nova Scotia's) people are engaged in industries other than agriculture. They are convinced of the value and necessity of this form of training, but have simply been financially unable to carry it out.⁸

Nova Scotia, as well as all other provinces except Ontario, was unable to claim its full allotment because of a provision in the legislation which allowed only 25 per cent of an unexpended or unearned balance to be carried forward. (See Table 1, pg. 12). The Act had been designed "to encourage and promote" technical education, yet Ontario, the province which received the greatest financial support, needed the least "encouragement" while a province such as Nova Scotia, which was willing but unable to take advantage of the legislation, was penalized for its poverty. Some, such as John Kyle, Provincial Organizer for Technical Education in British Columbia, thought this system was equitable:

We naturally lament the monies which revert to the Dominion treasury but after all it acts as a fine on provincial authorities who persist in retarding educational progress. The acting principle is to help those provinces that are willing to help themselves.⁹

Another deterring force to the poorer provinces was the provision that the Act terminate after ten years. According to the federal Department of Labour:

Some of the provinces hesitate to increase expenditures on vocational education, knowing that the Technical Education Act expires in 1929. They fear that they may build up a system of education which will involve greatly increased expenditures for the future and that they will be called on to bear the full cost after 1929. Undoubtedly the work would make more rapid progress if permanent federal assistance were assured.¹⁰

While federal financial support was not made permanent, the Act was extended to allow most of the provinces to take advantage of unexpended balances. Yet in one province at least, Nova Scotia, "the amount of the unexpended balance (fell) far short of enabling the local government to assist the towns and cities to provide as extensive vocational training as now exists in Quebec or Ontario."¹¹

The 25 per cent clause as well as the matched payment clause also proved to be deterrents to the growth of technical education on a nation-wide basis during the early part of the 1920's. An economic depression left the provinces without adequate financial resources forcing them to curtail programs in all areas. According to the Annual Report of the Department of Labour for 1922-23:

Provinces have reduced expenditures wherever possible and in some places vocational work has suffered along with other branches of education. The expenditures by the Provincial Governments on work coming within the provisions of the Technical Education Act decreased from \$2,201,534.03 in 1921-22 to \$1,835,093.20 for the past year, causing a corresponding decrease in the federal grants from \$720,336.05 to \$648,227.03. Classes have been discontinued in a

number of smaller places and there has been a decrease in the enrolments in the western provinces and in New Brunswick . . .¹²

The Robertson Report recognized the need of an adequate supply of well qualified teachers if a program of technical education were to be successful. There was a widespread agreement on this topic. Prof. Gill wrote that "in any educational work the teacher is by far the most important factor . . ."¹³ Senator Robertson, the Minister of Labour responsible for the administration of the Act at its inception, told the National Conference on Technical Education in 1920 (which was composed of officials from all the provinces who were responsible for the administration of the Act) that:

I may perhaps be pardoned for making the suggestion to you that there is one subject in particular, which ought to receive very serious and careful consideration at your hands, and that is the question of how best to provide means whereby a competent staff of teachers may be available for the needs of technical education in all our provinces.¹⁴

The problem of teacher education was twofold. First, there had to be an adequate supply of teachers which, it would appear, there was not in 1920. The Chairman of the Conference, G. P. Smith, the Minister of Education for Alberta stated that:

In spite of teachers' salaries doubled, in spite of the standards of qualifications having been raised, in spite of many things having been done that should make the teaching profession attractive and permanent, we find the enrolment in the normal schools in almost every province seriously reduced and the shortage of teachers increasing.¹⁵

The second problem was how to give the best training possible to teachers of technical subjects with the available financial resources. Wrote Prof. Gill:

It is within the financial possibilities of the provinces of Ontario and Quebec to provide teacher-training institutions which will meet their own needs, but at the present time it would be too great a burden for the other provinces.¹⁶

The solution to the problem as proposed by federal representatives was a co-operative Canadian effort. In his opening address to the First National Conference, Senator Robertson told the delegates:

. . . if . . . you find that there is any plan which can be adopted whereby you, unitedly, and we in co-operation with you, can bring about some centralized arrangement to provide a competent staff of teachers, better trained and better qualified than would be possible by the separate action of the provinces, we desire to do everything to strengthen your hands and to promote the efficiency of the service . . .¹⁷

Prof. Gill, the Director of Technical Education for Canada, also recommended a co-operative effort and suggested that the federal government would lend its financial support to the project.

. . . the problem, considered from a national standpoint, can be really solved only by co-operation on the part of the provinces . . . If the Provincial Governments can agree on some form of co-operative action, I am sure the Federal Government will aid in solving the problem. It has been suggested to me that the Federal Government should organize and administer an institution for this purpose, because it is a national work. This is neither possible nor desirable. The Federal Government may help, but local initiative must not be destroyed.¹⁸

With the encouragement of both Robertson and Gill, the Conference adopted the resolution that:

The Federal Government and the various provinces co-operate to establish and maintain one central institution for the adequate training of special teachers for vocational education.¹⁹

For financial, constitutional or other reasons the federal government failed to support the resolution.

The effects on the program were disastrous. The Annual Report of the Department of Labour for the year 1921-22 stated:

The chief reason for the decrease in the rate of expansion (for 1921-22) is the lack of adequately trained teachers to undertake the work. In their efforts to take advantage of the federal aid, the provinces, in some cases, entrusted the work to inexperienced teachers with the result that the work of these places has not been properly developed and in some places abandoned.²⁰

Only one province, Ontario, ever established a teacher training institution during the life of the Act. For financial reasons, the other provinces were unable to do so. As a result, the quality of the training provided was generally admitted to be of a very low standard.

The problem arose because the federal government had instituted a program for the whole country without examining the capacities of the individual provinces to undertake their share of the program. The federal government encouraged the provinces to take advantage of the offer of grants quickly and, as a result, the provinces were pushed into conducting a program without adequate preparation, thus to a large extent nullifying the objectives of the federal legislation.

The success of any piece of legislation depends in part on the ability of officials concerned to administer the program equitably. The Technical Education Act unfortunately, did not lend itself to equitable administration. The federal government, which changed from Unionist to Liberal in 1921, did not seem interested in making a special effort to cope with a difficult problem. In 1919, Prof. L. W. Gill was appointed Director of Technical Education, and a year later A. W. Crawford was appointed as his assistant. Gill had drafted the agreements with the provinces, and was the only person with the necessary expertise to administer the Act. When he resigned in 1921, Crawford was appointed to take his place. Crawford resigned in 1929 after seven frustrating years. No new Director was appointed. While Crawford was ineffective, the conditions under which he worked were to a large extent the cause of his problems. He had only a small clerical staff and was solely responsible for dealing with the provinces. This was a difficult task for, as Gill explained: "According to the terms of the Act, technical education is defined broadly enough to cover almost any educational effort."²¹ The problem of what kinds of work should receive federal grants was one with which Crawford had a great deal of difficulty and never succeeded in solving. In his report for 1923-24 he said:

No fixed standards have been established by which the courses in the various schools can be compared, and it is a very difficult matter to determine the eligibility of certain courses for federal grants . . . Because of the varying industrial conditions in each province and because of the newness of secondary

vocational education, a very liberal interpretation has been placed upon the foregoing definition.”²²

Crawford raised two other difficulties in the above statement. Some provinces, especially Saskatchewan, Manitoba, Prince Edward Island and Nova Scotia “lacked . . . interest in the development of industrial training.”²³ The main interest of these provinces was agriculture, and although funds had been provided for agricultural instruction, the Agricultural Instruction Act terminated in 1923. The situation was most serious in Prince Edward Island. H. H. Shaw, Superintendent for Education in P.E.I. (P.E.I. had neither a Minister of Education nor Director of Technical Education), explained the situation to Crawford:

I think that for our young people the greatest vocation is agriculture. The next greatest vocation is school teaching. The next is clerking in stores or businesses. These three vocations to my mind are about all we have. You are assisting the vocations in the different provinces, and you must take them as you find them. You have to see in what way you can best assist the vocations that need assistance.²⁴

Crawford, however, took the position that provision for agricultural instruction was not provided for in the Act. He told Shaw:

If you find that it is impossible in Prince Edward Island to promote new work of the type the Act is intended to develop, I would say that unfortunately, you would be deprived of the benefits of the Act.²⁵

It would appear then, that almost half of the provinces were faced with the dilemma of either changing their educational system to meet what they felt was not a provincial need or lose a federal grant.

There was considerable pressure on the federal authorities to change their grant policies, perhaps the most important of which was the Royal Commission on Maritime Claims which stated that:

In Prince Edward Island there are no large industries which would justify establishment of an institution for technical education. As agriculture is their principal interest, the Provincial Government suggested that the technical education legislation should be given a broad application in their case, and that agricultural education should be deemed to be covered by the term technical education. We recommend this suggestion to the favourable notice of the department.²⁶

A few years later the federal government accepted the recommendation.

It was equally difficult to establish a national standard of technical education. The Federal Director was the only federal inspector of provincial programs, a task surely too onerous for a single person. Furthermore, as Crawford recognized, there were constitutional limits as to what action he could take. He told the Second National Conference on Technical Education in 1927:

The Dominion Government has nothing whatever to do with the organization, administration and control of educational affairs in the provinces. All we can do, and all we hope to do, is to assist you in promoting the type of work which this Act is intended to promote . . .²⁷

Yet the problem still remained. The Director found that “the character and quality of the work being done is not entirely satisfactory. If a reasonable

standard of efficiency were demanded before payments of federal money were made about one-half of the work which is now receiving a benefit from the grant would be excluded".²⁸ Crawford, however, realized that:

Courses in each province differ so greatly from similar courses in other provinces that it appears to be impossible to standardize. If that be true I would like it to be known. It would be useless to set up any standard only to find that some province could not reach it. For instance, the course that is now being carried on in Prince Edward Island would not be recognized as a vocational course in Ontario . . .²⁹

With a growing sense of frustration, Crawford summed up the difficulties:

I feel that as a Dominion Government official I should not undertake to inspect or criticize the work in any province. I should be free from that because it is a responsibility of the Provincial Government, not of the federal government. Unless the Provincial Governments are prepared to set up some standard which I can easily interpret, I am at a loss to know just how far to go. The mere fact of naming a course in a certain way and stating that the objective is so-and-so does not make it so, and I am not justified in paying grants simply because somebody tells me what objective he has in mind. Surely there must be some minimum standard that can be set up . . . Am I to set up the standard for such a province, or could not this Conference . . . set up some standard which would be my guide?³⁰

The Federal Director had no standard of issuing grants and no method of inspecting provincial work other than that of personal inspection. The Conference never did agree upon a national standard perhaps because of the diversity of interests across the nation. The British North America Act further bound the hands of the Federal Director by preventing him from imposing a national standard.

In anticipation of the expiration of the Act in 1929, it was resolved "that this conference . . . strongly urge the continuance of the technical education grant for a further period of ten years after the expiration of the present Act in 1929."³¹ King's announcement in 1928 that he would allow the Act to expire drew considerable protest from the Opposition and the provinces. Only Ontario had been able to draw its full allotment. Only 20 per cent of the \$10,000,000 for the ten-year period had been distributed. Saskatchewan, Manitoba, Nova Scotia, and Prince Edward Island had not been able to draw half or more of their allotment. With this in mind the Federal Government agreed to pass the Technical Education Extension Act in 1929 permitting an unexpended portion of \$10,000,000 to be carried forward and be available under the terms of the original Act during the next five years. The Government also agreed to permit the use of some funds for the promotion of agricultural instruction. The Depression however, curtailed provincial spending so the Act was extended for a further five years to 1939. As Table 1, shows, it was not until 1949 that Manitoba finally drew all of its allotment (see page 98).

The Act, therefore, did have some success in that it encouraged an increase in enrolments, classes and construction, although mostly in the wealthier provinces. There are indications, however, that it did not provide industry with a ready supply of skilled manpower. The number of persons over 14 years of age employed in non-agricultural pursuits did increase by about 23 per cent from 1921 to 1931.³² More specifically the number of persons employed in the manufacturing and mechanical trades rose by 17

per cent.³³ There is no information available which would suggest that we can attribute these increases to the Technical Education Act.

Perhaps a more vital question is whether the Act was successful on a national basis in both the quantity and quality of the manpower it created. It appears not to have been. Saskatchewan, Manitoba, Prince Edward Island and Nova Scotia were not really interested in the program and had drawn less than half of their allotted funds by the time the Act expired. The Depression, which closely followed the expiration of the legislation severely reduced the need for skilled manpower, if there ever was such a need.

Stamp concluded that "... the Technical Education Act of 1919 was not passed when the country faced a shortage of skilled workers, but rather at a time of industrial dislocation and slowdown".³⁴ When a more obvious need arose at the end of the 1930's there was a serious shortage of labour.

The quality of the program was seriously affected because the interests of the provinces were so diverse that no voluntary arrangements could be made to standardize the program. Federal administrators of whom there were too few) were unwilling to impose a uniform standard on the province for fear of intruding on the provincial jurisdiction over education. As a result, funds were put to a wide variety of uses including agricultural education, which the originators of the legislation had not intended. Moreover, it was the wealthier provinces that were able to take the best advantage of the legislation so that educational opportunity was not equalized.

¹ R. M. Stamp, "Technical Education, the National Policy and Federal Provincial Relations in Canadian Education, 1899-1919," in the *Canadian Historical Review*, Vol. No. 4, December, 1971, p. 404

² *Ibid.*, p. 423.

³ Canada, Department of Labour, *Annual Report*, 1927-28, p. 156. ⁴ *Ibid.*, 1919-20, p. 106.

⁵ *Ibid.*, p. 106. ⁶ *Ibid.*, p. 105. ⁷ *Ibid.*, 1927-28, p. 156. ⁸ *Ibid.*, p. 156.

⁹ Canada, Department of Labour, *Vocational Education Bulletin*, No. 12, "Proceedings of the Interprovincial Conference on Vocational Education April 17-18, 1925", p. 28.

¹⁰ Canada, Department of Labour, *Annual Report*, 1924-25, p. 70. ¹¹ *Ibid.*, 1929-30, p. 154.

¹² Canada, Department of Labour, *Annual Report*, 1922-23, p. 74. ¹³ *Ibid.*, 1919-20, p. 106.

¹⁴ Canada, Department of Labour, *Vocational Education Bulletin*, No. 1, p. 9. ¹⁵ *Ibid.*, p. 58.

¹⁶ Canada, Department of Labour, *Annual Report*, 1919-20, p. 107.

¹⁷ Canada, Department of Labour, *Vocational Education Bulletin*, No. 1, p. 10. ¹⁸ *Ibid.*, p. 16. ¹⁹ *Ibid.*, p. 17.

²⁰ Canada, Department of Labour, *Annual Report*, 1921-22, p. 65.

²¹ Canada, Department of Labour, *Vocational Education Bulletin*, No. 1, p. 16.

²² Canada, Department of Labour, *Annual Report*, 1923-24, p. 83. ²³ J. A. Maxwell, *op. cit.*, p. 211.

²⁴ Canada, Department of Labour, *Vocational Education Bulletin*, No. 20, p. 10. ²⁵ *Ibid.*, p. 10.

²⁶ Canada, Department of Labour, *Annual Report* 1926-27, p. 115.

²⁷ Canada, Department of Labour, *Vocational Education Bulletin*, No. 20, p. 8.

²⁸ Canada, Department of Labour, *Annual Report* 1920-21, p. 101.

²⁹ Canada, Department of Labour, *Vocational Education Bulletin*, No. 20, p. 15. ³⁰ *Ibid.*, p. 16 ff.

³¹ *Ibid.*, p. 5. ³² M. C. Urquhart and K. A. H. Buckley, *Historical Statistics of Canada*, Toronto, 1965, p. 59.

³³ *Ibid.*, p. 59. ³⁴ R. M. Stamp, *op. cit.*, p. 423.

TABLE 1
SUMMARY OF AMOUNTS PAID TO PROVINCES UNDER
THE TECHNICAL EDUCATION ACT 1

Year	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Total
1919/20	\$ -	\$ -	\$ 3,396	\$ 36,500	\$ 106,297	\$ 2,648	\$ 1,142	\$ 17,107	\$ 19,407	\$ 186,497
1920/21	2,700	24,193	10,408	167,886	294,111	7,268	3,534	41,438	29,133	580,671
1921/22	7,241	32,758	22,758	114,651	378,174	21,173	13,665	82,606	47,904	720,332
1922/23	5,858	33,166	17,476	128,182	314,206	25,121	18,263	71,019	34,932	648,223
1923/24	6,550	35,501	20,382	328,682	347,636	20,092	18,397	57,613	53,535	888,388
1924/25	1,950	34,623	43,040	263,399	347,636	19,500	17,249	62,215	40,860	830,472
1925/26	7,254	30,999	93,874	299,143	347,636	19,488	20,083	72,731	53,123	944,331
1926/27	7,757	31,494	76,208	403,944	347,636	20,056	18,021	85,789	56,627	1,047,532
1927/28	11,981	29,224	70,107	329,072	347,636	27,529	17,048	74,000	59,355	965,952
1928/29	20,369	47,083	48,637	372,890	347,636	28,527	25,159	92,222	169,637	1,152,160
1929/30	22,117	21,525	51,951	125,302	-	41,541	60,505	21,779	68,563	413,283
1930/31	30,790	73,669	50,025	-	-	38,621	198,289	-	-	391,394
1931/32	31,898	48,699	4,791	-	-	27,488	170,094	-	-	282,970
1932/33	29,370	50,628	-	-	-	46,169	75,567	-	-	201,734
1933/34	12,344	47,691	-	-	-	23,064	45,970	-	-	129,069
1934/35	-	39,615	-	-	-	9,430	41,673	-	-	90,718
1935/36	-	48,765	-	-	-	2,654	47,363	-	-	98,782
1936/37	-	32,471	-	-	-	14,099	21,533	-	-	68,103
1937/38	-	-	-	-	-	14,813	34,055	-	-	48,868
1938/39	-	-	-	-	-	27,116	-	-	-	27,116
1939/40	-	-	-	-	-	30,732	-	-	-	30,732
1940/41	-	-	-	-	-	18,340	-	-	-	18,340
1941/42	-	-	-	-	-	40,727	-	-	-	40,727
1942/43	-	-	-	-	-	18,703	-	-	-	18,703
1943/44	-	-	-	-	-	23,497	-	-	-	23,497
1944/45	-	-	-	-	-	25,061	-	-	-	25,061
1945/46	-	-	-	-	-	29,496	-	-	-	29,496
1946/47	-	-	-	-	-	25,425	-	-	-	25,425
1947/48	-	-	-	-	-	34,235	-	-	-	34,235
1948/49	-	-	-	-	-	29,001	-	-	-	29,001
Total	\$198,179	\$662,104	\$512,455	\$2,569,651	\$3,178,604	\$711,614	\$847,610	\$678,519	\$633,076	\$9,991,812

1. Canada, Department of Labour, Vocational Education, Bulletin No. 30, October, 1929, p. 42.

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The Uses of Attention

Ability to attend is considered in relation to mental retardation and learning disability. Following a theoretical and methodological treatment of certain aspects of attention, the use of attention as a criterion to distinguish retarded from nonretarded children is described. Some suggestions for optimizing attention during teaching are offered. Models for viewing learning disability in terms of attention, arousal and information processing are discussed. It is suggested that there is a need to rationalize theory and practice in the areas of retardation and learning disability, taking account of individual differences in attention and information integration.

In your eyes will be the darkness of ignorance but your mind will retain a flicker of recognition.

— Tagore

We attend to internal events as much as we do to external ones. Ideas and internal schemas not only force themselves into one's focus of attention, but "the flicker in the mind" can guide and maintain purposeful behavior. Attention is directional. It is an active, reconstructive, general cognitive function (Neisser, 1967).

Attention to both external and internal events can be measured in the same manner; probably they share the same neural mechanisms. Methods for measuring attention physiologically usually include recordings of electrical properties of the brain, increments and decrements in heart rate, respiration, electrical conductance of the skin, and fluctuations in blood volume. Thoughts and other cognitive activities can influence these physiological measures as much as stimulation by external agents.

As a child develops, he first attends to only external objects, but then around the age of two the idea of the object is also attended to. Perhaps the turning point is reached at the same time as the child learns to use speech and language. Schachtel (1959) has distinguished between auto-centric perception, which is confined to pleasure, pain, heat, cold and smell, and allocentric perception, which enables the child to have a grasp of the real world. Allocentric perception is representational. It involves

attending to conceptual schemata and is characteristic of adult attention. Attention is by no means passive; it is used actively by child and adult to reconstruct experience for higher cognitive functions.

The methods of measuring attention described above are, in fact, measures of the orienting response. Pavlov (1928, 1941) describes the orienting response as the "What is it?" response. The orienting response is selective in that it is not indiscriminately evoked by any stimulus and it can be conditioned and extinguished. As a response to novelty or discrepancy, it serves the dual purpose of facilitating the reception of significant stimuli while protecting the organism from reacting to inconsequential ones. Damage to the cerebral cortex often makes the organism attend indiscriminately to all sorts of stimuli in the environment. For this reason, the formation and maintenance of adequate orienting responses are often indices of a healthy cortex.

Sokolov (1960, 1963) has put forward a neuronal model of the orienting response based on his own and Pavlov's observations. Briefly, the model assumes the presence of a screening and an amplifying system in the cortex. The screening system incorporates a chain of neural cells which preserves information about the intensity, quality, duration and order of presentation of the stimuli. To these characteristics one may add the semantic characteristic when the stimulus is verbal. If an arriving stimulus does not match the information stored in the screening system, the orienting response is evoked via the amplifying system. The orienting response is thus not the result of indiscriminate stimulation by an external agent, but that of the noncoincidence of the stimulus and the neuronal screening model. The model can handle complex stimuli such as words and symbols as well as simple sensory stimuli. Essentially, it is an information measurement model which forms a program of stimulation and matches it with all in-coming stimulation in order to pick up discrepancies. The orienting response is a consequence of these signals of discrepancy. In Sokolov's model, the activation of the reticular formation by the screening model occupies a central role.

In our laboratory we have looked at changes in the heart rate and the conductance of the skin as two basic measures of orienting response. We would ask a child to listen to a series of words that he knows and press a button every time a certain word such as "man" occurs in the series. Let us further suppose that the word "box" always preceded "man" in the series. In most children, as soon as they hear "man" the heart slows down for a couple of seconds and the electrical conductance of the skin increases significantly. Usually there is a delay of from 1 to 1.5 seconds between the presentation of the word and the occurrence of changes in heart rate and skin conductance. Some children not only show these reactions to the word "man", which they are supposed to respond to by pressing a button, but also they respond to the warning signal "box" in anticipation of the word "man". Other words in the series do not produce any noticeable reaction.

Attention in retarded children

Several research workers in the area of mental retardation have noted that the retardate suffers from attentional deficit and this contributes to most of his learning disabilities (Luria, 1963; Ellis, 1963; Zeaman and House, 1963). The deficit is generally attributed to the retardate's weak central

nervous system. The weakness may reflect an immaturity and the relative absence of integration in the central nervous mechanisms which, in its turn, might be the consequence of specific or diffuse cortical damage. Whereas most developmental psychologists would agree that the retardate has an immature central nervous system, the association of a pathological condition of the cortex to retardation appears to be favored mostly by Soviet workers. In any case, the consequences of a generally weak cortex are seen in the cognitive activities of the retardate. The critical symptom of an attentional deficit in the retardate is thought to be his proneness to distraction by irrelevant stimuli in the learning situation. It may be described as a disinhibition of orienting response. Often, such distractibility will reflect the lack of an efficient screening system by which only stimuli having recognized signal values arouse the orienting response of the normal subject.

We have attempted to verify whether the retardate is really deficient in his attention by a series of experiments. Before carrying out these experiments, we expected, following Luria, that the retardates would give fewer orienting responses since their verbal system is too weak to maintain self-instructed behavior. The orienting responses in a learning situation, therefore, cannot be sustained by the retardate if we ask him to attend to the significant stimuli. Because of weakness in cortical functioning, the retardate cannot maintain an instructional set, hence he fails to concentrate and attends to "irrelevant" stimuli.

First, we wish to describe an experiment on the habituation of orienting response. Habituation of orienting response follows when a stimulus is repeatedly presented without any consequence. It is a natural phenomenon, a way by which an organism checks itself from unnecessary expenditures of energy by not attending to stimuli which have no immediate significance. Complex stimuli such as words or nonsense syllables should habituate more slowly than the simple ones like light flashes or tones. Mentally retarded children may require a number of repetitions of a complex stimulus to form an adequate model of the stimulus. Then comparisons between the stimulus and the model can be carried out. A simple stimulus such as a pure tone, however, requires far fewer repetitions for a model to be formed. In one experiment, we presented a tone, familiar words such as "love" or "friend" and unfamiliar nonsense syllables such as "yuf". We found that the galvanic skin responses were evoked by the tone, the word and the nonsense syllable; but when each of these stimuli was repeated over and over again, the responses to tone habituated much faster than the responses to word and nonsense syllable. Since we were using severely retarded children as our subjects in this experiment, it seems that for them word and nonsense syllable were complex stimuli, whereas a tone was a simple stimulus. For normal children, however, one may find that familiar words like "love" or "friend" would be as simple and readily comprehensible as a tone, whereas a nonsense syllable would be the complex stimulus.

Habituation of an orienting response such as a galvanic skin response can be resisted. It is achieved by making the stimulus an imperative signal for a motor response. An illustration is provided by an experiment where we compare retarded children with normal children of equal age. The task involved listening for half-an-hour to a series of six familiar words which

were auditorily presented by means of a tape recorder. The children were asked to detect the occurrence of the word "man" which was an imperative signal for button pressing. A preparatory signal word "box" always preceded "man". As mentioned before, the retarded children gave a significantly larger number of responses to the imperative signal "man", whereas the normals gave a greater number of responses to the preparatory signal which was "box". Why did the imperative signal evoke more frequent responses for the retarded? It has been observed that the less firmly established the response, the greater would be the galvanic skin response. It seems logical to conclude that the retardates could not expect the occurrence of the imperative stimulus as strongly as the normals did. For the retarded children, the greater frequency of the galvanic skin response was a sign of the uncertainty experienced by them.

We have seen that a stimulus ceases to evoke an orienting response within a few presentations if it is not attached to a motor response. However, if it is given a signal value, the orienting response is again elicited by the stimulus. The signal value of the stimulus can be given through instructions. It was demonstrated very clearly in an experiment where we first let the orienting response habituate to a certain stimulus, and then reinstated it through instructions. In order to establish habituation, the subject was asked merely to listen to some words such as "boy" and "chair" for about six minutes. At the end of this period the galvanic skin responses which we were using as an index of orienting response decreased substantially, but it was quickly reinstated by asking the subject to press a button as soon as he heard one of the words such as "boy" and to do nothing when he heard the word "chair". The orienting response to "boy" was immediately reinstated, whereas the orienting response for "chair" continued to be low and infrequent. In none of these experiments could we find gross differences between the normal and the retarded child's ability to attend to words which have a signal value, and not to attend to those which are irrelevant.

We have successfully demonstrated the use of instructions for establishing signal meaning as well as to inhibit attention to signals which have lost their meaning. It must be remembered that the orienting responses are autonomic changes, and are not voluntary; but their evocation and inhibition are mediated by cognitive processes. These cognitive processes control changes both in heart rate and in electrical conductance of the skin in retardates as effectively as in normal subjects.

Optimal conditions for attention

We have now carried out at least five studies in which normals and retardates were compared. A general deficit in attention, as indicated by the orienting response, was not found in the retarded children in any of these studies (Das, in press; Das & Bower, 1971; Bower & Das, 1972). This may be due to two special features in our experiment. Neither the young retardate nor the normal child has a fully developed verbal system. Hence it is difficult for him to maintain a response to self-instruction. However, at a mental age of five or better, the normal child, as well as the retarded child, begins to regulate simple motor acts through speech (Luria, 1961). We have used retarded children above a mental age of six years and perhaps

that is why orienting responses were efficiently maintained through the verbal instructions given by the experimenter. The instructions are interiorized by the subject; they produce an internal set which persists throughout the experiment.

The other reason for the efficiency with which the retardates performed the attentional tasks is to be found in the nature of the learning environment and the task itself. The tasks did not demand other abilities, such as comprehension or memory, in great measure. They were tasks demanding only attention. The learning environment was special. It was a noise-free laboratory environment without any distractions. The laboratory was bland, painted neutral grey, soundproofed, and had no distractors such as pictures or calendars. This laboratory environment was in contrast to the usual classroom for retarded children which has several distracting items: the dress and mannerisms of the teacher, the paintings and other handwork of children on the wall, and the activities and noise produced by other children in the classroom. Within our controlled setting, instructions could effectively draw the attention of the retarded children to the salient features of the task. If the implications of our findings can be generalized, we would suggest the use of verbal instructions to direct and guide the subject's attention, not only in academic programs, but even in non-academic classes such as arts and crafts. A special feature of our task was its duration of 20 to 25 minutes. This short duration, associated with familiar stimuli and involving minimal learning in the task, apparently optimized maintenance of attention. It seems reasonable to suggest that when task difficulty is increased, the task duration should be reduced to maintain the same level of attention. Perhaps, in ordinary classroom learning, the material to be learned should be presented not only in graduated steps, but the duration of the lesson should be shorter than 20 minutes. It is worthwhile to explore the possibility of short periods of learning in an isolated noise-free environment interspersed with recreational activity periods of longer duration.

Attention, arousal and learning disability

The measures of attention such as the galvanic skin response and heart rate have been used traditionally as measures of emotion or arousal. Arousal is closely related to the balance between excitation and inhibition in the central nervous system. The seat of arousal seems to be in the brain stem, especially in a structure called the reticular formation. The reticular formation is essential for understanding the orienting response. The screening and amplifying neuronal model proposed by Sokolov is intimately related to the functions of the reticular formation. For example, excitation is influenced by the reticular structure of the mesencephalic and the diencephalic areas, while the bulbous section of the reticular formation exercises predominantly an inhibitory action. Consequently, the stimulation of the ascending reticular formation facilitates galvanic skin responses, while removal or suppression of this reticular area significantly raises the threshold of galvanic skin responses to peripheral stimulation. What this means, essentially, is that an interaction exist between the emotional and orienting components of an organism's reaction to significant or novel stimuli.

Any professional, working with retarded or "learning disabled" children, notices a wide variety of individual differences in behavior. These differences can be grouped in three classes in terms of excitation and inhibition. There is the excitable type showing a high level of arousal, the inhibitory type with a low arousal level, and the balanced type where excitatory and inhibitory processes are in equilibrium (Luria, 1963). The first group could be called hyperactive, the second hypoactive. The hyperactive child, in whom excitation predominates over inhibition, finds it hard to establish complex forms of behavior where certain responses have to be suppressed and others have to be facilitated. He shows marked distractibility while doing a task; a simple question by the teacher, or the ringing of bells outside, may distract him completely so that he can no longer go on with the task. The hypoactive child is usually a slow child. He takes too long to acquire a response, and once acquired, the response fades away quickly. He is slow to take out his books, slow to gather his things when school is over, slow in asking questions or giving an answer.

At this point, it is instructive to compare the symptoms of the minimally brain-damaged child with the characteristics of the three types of children. Generally, it would seem that most of the characteristics of the typical brain-damaged child described by Strauss and Kephart (1955) would compare with the clinical group in which excitation dominates over inhibition. Strauss and Kephart list the following characteristics for the brain-damaged child: distractibility, breakdown of inhibition (mostly social), a high response intensity given by the children, and lastly, perseveration of the past response, even when it is no longer required. Each of the above is also a recognizable trait of the "excitable child" in Luria's classification (1963). According to Strauss and Kephart, however, the chief difficulty of these children is in spatial integration. These authors observed that the brain-damaged child has an incapacity to see simultaneously. Perhaps he always sees succession and only rarely can combine these successive events into simultaneous impressions. What of the four characteristics of the brain-damaged child? According to Strauss and Kephart, it seems that forced responsiveness to stimuli, distractibility, foreground-background disturbances, perseveration and the like can be traced to this primary disturbance or deficiency relating to the child's inability to see simultaneously.

It would appear, from the theory of Strauss, that the typical learning-disabled or minimally brain-damaged child should be hyperactive. However, if one accepts Luria's classification, it is not necessary that all learning-disabled children should be hyperactive. They could as well be hypoactive. Typically, though, clinicians concerned with learning disabilities do not take into account the slow child (in whom inhibition predominates) and the balanced child, who is neither hyper- nor hypoactive, but who might be weak in forming new habits as well as in breaking old ones.

We would like to propose that the relationship between level of intelligence and the level of arousal is orthogonal. We come across the hyperactive-bright child as well as the hyperactive-dull child. Some learning disability clinicians may limit their research to the hyperactive-bright child only. Similarly, we find in our classrooms bright children who are somewhat slow, as well as dull children who are slow. Indeed, in certain sub-

cultures, speed in performance is differentially reinforced. In a particular group, speed may be emphasized, whereas in another group accuracy and persistence may be preferred to speed. In the context of this double system of co-ordinates—intelligence and arousal—where can we place the learning disabled or the so-called minimally brain-damaged child? Perhaps a learning-disabled child may be found in all quadrants except one—the slow and bright quadrant. It is at best artificial to consider only the hyper-active-bright child as learning disabled, as some specialists maintain.

The area of learning disability is characterized by capricious definitions and labelling. Frequently, minimal brain damage or learning disability is confounded with the condition of mental retardation. The distinction between the two (that is, retardation and minimal brain damage) appears to be fixed by IQ—the deficient child with IQ less than 100 is labelled retarded, whereas a child with IQ above 100 is called minimally brain-damaged, even when both may display identical sets of symptoms (cf. Wender, 1971). Strictly speaking, learning disability should be identified in terms of a perceived difficulty in learning school subjects such as reading, writing and arithmetic. A child who has the potential to learn these skills, and yet has trouble in demonstrating efficiency in any one of them, could be justifiably called learning disabled. On the other hand, the label “minimal brain dysfunction” connotes a hypothetical etiological state of the brain which may cause certain behavioral dysfunctions, most of which become apparent only when the child enters school at the age of five or six. Therefore, the behavioral signs of learning disability and minimal brain damage are inextricably blended. It seems impossible to separate the symptoms of one from the manifestations of the other. For all practical purposes, it may be best to regard the minimally brain-damaged child as equivalent to the learning disabled child. Authorities in the field (Wender, 1971; Haywood, 1968) would concur with such a view.

But the relation between excitation-inhibition balance and minimal brain dysfunction is not as clear as we wish it to be. One may ask if the Strauss children and the predominantly excitatory type in Luria's category should share the same kind of cortical dysfunction. For instance, consider the effect of cortical excitation on arousal, and contrast this with the effect of cortical inhibition. Eysenck (1967) has hypothesized that cortical excitation is behaviorally manifested as the inhibition of autonomic responses. In contrast, cortical inhibition is manifested in behavioral arousal or an augmentation of autonomic activities. The brain-damaged children studied by Strauss may in fact be cortically inhibited. This might be supported by the fact that there has been an increased use of amphetamines to control excitability in the minimally brain-damaged children. Amphetamine has a paradoxical effect of quieting or depressing the brain-damaged child, whereas it acts as an excitant for an adult. If one assumes the level of cortical inhibition to be high in the brain-damaged child, then amphetamines being excitants would decrease the level of cortical inhibition which would then result in a greater cortical control of autonomic processes. Wender considers the amphetamine test as crucial evidence in classifying a child as minimally brain-damaged.

It is apparent from the above discussion that one needs a rational

model for interpreting the behavior of the brain-damaged child and subsequently to design appropriate remedial procedures. Such a model cannot be arrived at as a by-product of psychometric testing because the majority of tests given for detecting basic deficiencies in the so-called learning disabled or brain-damaged child do not often have either a sound theoretical basis or practical validity. It is noticed that the difference between a learning disabled child and his classmate in a certain test may disappear once the tester controls for IQ. In other words, variations in performance on diagnostic tests of learning disability may not exist when one partials out the effect of intelligence. Some widely used tests, such as Frostig's, have a high loading on general intelligence. Apart from these theoretical considerations, when one looks at the practical validity of such tests and the remediation procedures they recommend, one is surprised to find that the remediation improves the test behavior itself, and does not generalize to compensate for the academic deficiency for which the child was referred to a clinic in the first place.

Learning disability and information integration

A rationale for viewing minimal brain dysfunction or learning disability may be suggested here. School learning in the lower grades may be simply considered as consisting of two basic processes: the registration of information and the processing of information. Registration involves sensory perception and communication to appropriate areas of the cortex where further analysis may be carried out. Since all incoming information at any given moment cannot be registered, the child has to select and screen the information that he receives. In other words, registration is a directional process, and may reflect active search and thinking. One can describe it as selective attention and concentration, a variant of which we study under the orienting response.

As mentioned previously, it is hard to separate the components of arousal from attentional responses such as the orienting response. Therefore, individual differences in arousal level become important when registration of information is considered. If the child is prone to distraction because of an abnormally high arousal level, then the presentation of the task should take this into account. On the other hand, if the child is hypoactive, slow to be aroused, the learning situation should be designed to offer a relatively greater amount of stimulation rather than to minimize the number of stimuli. In short, individual differences in attention should be considered. After information is registered, the analysis and integration of the information plays a critical role in learning. Information can be processed in sequence or in a parallel form. Luria (1966) calls this successive and simultaneous synthesis. In simultaneous synthesis, the child is required to arrange the input in a simultaneous array in order to arrive at the judgement, whereas in successive synthesis the input must be arranged in sequence. I have recently used a set of tests which measures successive and simultaneous integration (Das, 1972, 1973). Factor analysis of these tests showed that tests such as Progressive Matrices, Figure Copying and Memory for Designs have a high loading on simultaneous integration, whereas other tests such as Short-Term Memory and Serial Recall have high loadings on the successive integration factor. In addition to these two

factors, we also obtained a third factor which appears to be the speed with which information is processed. Thus, if the problem of the learning disabled child does not lie in the area of attention, but of information processing, then one has to determine whether a child experiences difficulties in simultaneous-spatial integration or in successive-temporal integration. We have already referred to the fact that the minimally brain-damaged child described by Strauss experiences particular difficulty in simultaneous processing. Once the difficulty of the child in the area either of simultaneous or successive integration, or the speed of integration, is identified, then appropriate remedial procedures could be instituted. For example, if a child has problems with simultaneous integration, alternative methods of teaching which lay emphasis on successive integration may be devised.

Conclusions

Attention is thus found to be a critical variable in considering the learning abilities of mentally retarded and "learning disabled" children. With regard to the retarded child, an extension of the conditions prevalent in the laboratory to the learning situation in school should be given serious consideration. Distractibility is not unmanageable; for, it was observed in a number of studies in our laboratory, that the retardate's attention as indexed by the orienting response could be evoked and maintained as efficiently as it could be in nonretarded samples.

The relationship between orienting response and arousal needs to be considered in the context of individual differences in arousal level. The hyperactive child is only one of possibly three types of children, the others being the hypoactive and the balanced types. Although the "learning disabled" or "minimally brain-damaged" child is usually identified with the hyperactive child, it does not seem quite justified to do so. It is suggested that the relationship between intelligence and arousal level is orthogonal and that the "learning disabled" and the mentally retarded children can be assigned to one of the four quadrants of the co-ordinates, depending on their IQ and arousal level. From another point of view, the learning disabled child may be considered to have problems with the registration and integration of information. Information registration is closely related to the orienting response, whereas integration may involve at least three abilities—simultaneous and successive integration, and the speed of integration. In remedial work with the learning disabled child, it is important to determine the source of his difficulty in terms of information processing, and then formulate a remedial program.

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Soviet Studies in Language Acquisition

This article surveys the special theories and empirical studies of language acquisition carried out by Soviet psychologists, especially in the period since 1950. The basic principles of materialism, historicism and social reference characteristic of Soviet Marxist psychology are placed in contrast to certain current tendencies in American linguistics. The relevance of the Soviet experimental studies for the understanding of child development is brought out.

Most of the Soviet studies of language have been carried out by, and for, psychologists, so it is necessary at the outset to characterize Soviet psychology. It is a much more monolithic field than American or European psychology, because from about 1923 attempts have been made to base it on a single theory: dialectical materialism. This has succeeded from about 1955. This philosophy has three basic principles which must be followed. First, psychology must be *materialistic*, not idealistic. Consciousness is a reflection of outer, material reality. Matter is primary, and consciousness is derivative. Thus there is no dichotomy between thought and matter. All mentalistic theories postulating "innate" mental processes are rejected automatically. Rather than being an object of philosophical inquiry, mental processes must be investigated scientifically in the field of physiology (Simon, 1957). This view obviously owes much to the pioneering work of Pavlov.

Secondly, psychology must take a *historical* view. Not static phenomena, but the development of the formation of mental processes must be the object of study. All things must be studied in their movement and change; and in connection with other related phenomena (Luria, 1959). Movement is conceived of not just as mechanical motion; movement can be in quality too. Matter in motion is primary; this "generates" everything else (Simon, 1957).

Thirdly, psychological activity is considered to be *social* activity. Social circumstances determine mental development. Changes in the form of the child's activity can cause changes in the organization of his mental pro-

cesses; therefore education, a different kind of social interchange, can be of key importance in mental development (Simon, 1957).

Since Pavlov influenced much subsequent psychology, it is necessary to know what theories he proposed and what terminology he used. Even those Soviet psychological studies which do not fit in with Pavlovian theory use this terminology so as to conform to the "party line". Pavlov was the discoverer of the conditioned reflex, and concluded that all higher nervous activity is effected through the mechanism of unconditioned and conditioned reflexes. It is the cerebral cortex that forms new connections between the organism and the environment; nervous processes are behind all psychological processes (Simon, 1957). Pavlov also found that words are also environmental stimuli in special ways, that language and speech constitute a "second signal system" (Simon, 1957).

Some terms important in reading Soviet studies are:

"temporal connection" means a conditioned reflex, and refers to the neural connection made in the cortex relating the organism to his environment. "a signal system" is a system of secondary "conditional" stimuli that trigger responses.

"excitation" refers to the process of stimulation which activates a response and is opposed to "inhibition", the repression of a response.

"the law of irradiation" refers to the fact that excitation and inhibition begin in a focal point of the brain and then radiate, or spread, to other areas, causing a "generalization" of their effect.

"the law of concentration" refers to a narrowing of the focus of excitation or inhibition causing discrimination between stimuli.

Pavlov developed an extremely complex and detailed concept of the organism as a self-regulating system, functioning in and adjusting to the environment through a learning process which is mediated through association processes operating at the cortical level. His views are radically different from those of the American school of behaviourism—Watson, Guthrie, Lashley, Skinner.

An important difference between American and Soviet psychology lies in the definition of the function of psychological study. The Soviet interest in psychology is mainly based on the belief that it is a means of helping create the new "Soviet citizen", of providing a "scientific foundation for directing the development of the individual." (Kostyuk, 1968). Psychology is used as a basis for educational policies, the problem of child development being of central concern. These differences are reflected in Soviet language research.

"The Psychology of Speech"

The source of mental processes is social, and they develop in communication with their people. The central process of the child's intellectual development is the transmission through adults of knowledge; this transmission is by speech. Thus, the study of speech, the basic means of communication, has always been an essential part of Soviet psychology. (Luria, 1959).

Taking a historical approach, Soviet psychologists believe that the phylogenesis (changing of the animal to the human brain) and the ontogenesis of consciousness (mental development from the child to the adult)

are dependent on language and speech. Much research has gone into investigating the exact relationship of thought and language.

In terms of phylogenesis, Vygotsky summarized research with animals showing that speech and thought arise from different roots in animals; their thinking is unrelated to speech. For example, apes have the necessary vocal apparatus for speech, but they do not speak; they use sounds only as a means of expressing emotional states. Intellectually, they are capable of using signs functionally, but their thought is related to vision and not to the articulatory system. When solving a problem, such as getting food which is out of reach, they must *see* the solution—a stick—before they can figure out what to do. There is no close correspondence between thought and speech in apes as there is in man (Vygotsky, 1962).

Ontogenetically, thought and speech development in man are not congruent, nor even parallel. There is a pre-intellectual phase of speech, in which children use sounds for emotional release. There is also a pre-speech phase of thought development, in which children learn to use tools in the same way as apes. At age two, the thought and speech lines converge: thought becomes verbal, speech becomes rational. At this stage, the child actively seeks out names for things, rather than passively listening to words spoken to him. Before two, his learning of the names of objects is a matter of conditioned responses, in which repetition of a word in connection with a given object finally becomes a connection in the child's mind. This involves only the first system of signals as in animal subjects. After two, the child is himself curious about words, and begins to use them creatively (Vygotsky, 1962). In this way, the child passes over to the second signal system, uniquely characteristic of human beings.

Since philosophically, Soviet psychologists reject all mentalistic theories and refuse to view any one thing, such as verbal processes, in isolation from others and not as part of a total environment with mutually interacting parts, Soviet speech research has always been "psycholinguistical." The term itself was not used until 1967, by A. A. Leontiev. Before that it had been called "the psychology of speech" (Slobin, 1969).

A comparison of recent Soviet and American psycholinguistic studies shows the interesting fact that the two lines of thought, so different in origin, seem to be converging. Americans have discovered more recently than the Soviets that the investigation of language cannot be carried on in isolation, since speech is a social, and a psychological, as well as a linguistic activity. In a lecture, George Lakoff has ventured to say that there is no real distinction between competence and performance; that grammaticality is not an abstract category but is connected with concrete instances of conversation. Soviets linguists would agree whole heartedly. For example, Raevsky states that the opposition of language and speech (language is social and speech individual) by foreign authors is artificial; both language and speech are social (Raevsky, 1958).

Secondly, the pendulum of American thought is swinging away from Chomsky's mentalistic "innateness" theories. To say that children possess an innate capacity for language is hardly an explanation for their amazing acquisition of such complex structures. Soviet research on the phylogenetic

development of speech, and studies of the relationship of thought and speech are more illuminating.

Americans are also beginning to examine psycholinguistic data for possible uses in education. A. E. Suprun (1968) was incredulous that Chomsky could make such a statement as "no one teaches the child (language)"; the Soviet view is that society teaches the child, and that greater knowledge of how children learn will make society's task easier.

Child acquisition of language: psychological emphases

Soviet research on the acquisition of a first language emphasizes the functions that speech performs and how these functions are related to the development of speech. The first and most basic function of language is communication (social interchange). This is accomplished even before any speech sounds can be produced by the infant by intonation patterns. R. V. Tonkovo-Yampol'skaya studied "the development of speech intonation in infants during their first two years of life." She found that intonation has definite physical characteristics that are related in a unique structure, which she terms the "intoneme." By correlating an electroacoustical analysis of intonograms with observation of the emotional state and behavior of the infants while they were producing the sounds, she answered the questions: does the cry of a newborn baby have any intonational structure? What are the intonations in the babbling of the 0 to 1 year old? Are they communicative? What are the characteristics of the intonation repertory of infants in the second year?

Her data showed that the cry of a newborn infant *does* have an intonational structure. In fact, comparing these with adult intonogram patterns, she found that the adult discomfort intonation is the same as that of the newborn baby. The 2-month old has two intonations, for comfort and discomfort. Between 3-6 months, two more intonations are added, happiness and laughter. It is definitely intonation that communicates these emotional states to the adult, because often the phonetic components are the same. Between 6-12 months, new intonations arise: exclamatory delight, and requesting, probably learned by imitation of adults. During the second year, only the questioning intonation is added; at this age more energy is being spent on phonetic and morphemic mastery than on intonation (R. Tonkovo-Yampol'skaya, 1969).

Although the evidence is not conclusive, such a study calls our attention to an area that foreign language teaching has often neglected: intonation as an integral part of the language and a basic requirement for communication. No matter how complete the student's mastery of the phonetic and syntactic features of a language, the wrong intonation patterns will constitute a strong foreign accent. A greater emphasis on intonation in the early stages might allow for more communicative drills; in the early stages of learning a new language, when students have very limited vocabularies and sentence patterns, it is difficult to put them in communicative situations. If they were taught intonation patterns first, perhaps along with other non-linguistic means of communication such as gesture, initial dialogues would be more interesting.

Language does not arise automatically in humans. Wild children who

grow up without human contact do not acquire language. The Soviet view is that children's speech arises only out of a need for communication with adults and with other children. A. R. Luria has carried out an interesting investigation proving this point, using a set of twins who had retarded speech but no mental retardation; their speech deficiency was partly congenital and partly due to their social situation. Twins occasionally have retarded speech since they are together constantly and know each other so well they don't need to express themselves verbally. Up to the time they were 2 years old they knew no words; at 2½ they knew "mama" and "papa", at 4 they had their own autonomous language they used with each other and a few real words they used with adults only.

Their "autonomous language" consisted lexically 84.3% of very common or distorted words, and 11.7% of autonomous words which had meaning for them alone. Single words applied to whole groups of objects, such as "makoka" (morkovka—carrot) for carrots, turnips, plums, and even water-melons! Certain objects had several names, such as "abaka" and "abba" for sobaka (dog). 20% of all their spoken words were their own names. Obviously, these words could have no fixed meaning; their meaning was determined by the concrete activity going on (this is called "synpraxic" speech). There was no "grammar"; the word was completely interlocked with activity in 92-94% of all cases. Similarly, they did not understand speech when it was not connected to a concrete situation, and did not understand grammatical features. (While playing that they were on a boat, they were asked, "Where are you going?" They answered, "The boat.")

In order to determine how much the social situation determines language acquisition, the twins were placed in separate kindergarten classes. After only 3 months, they started using real speech; there was an increase in their real vocabulary, extended phrases of the subject-verb-object type arose, and speech took on planning and narrative functions as well as accompanying concrete activity. Synpraxic speech fell to 44% and 60% of all speech. Thus, with a change in their social situation, the structure of the twins' speech changed rapidly and drastically in lexicon, grammaticality and function (Luria, 1959).

Luria's conclusion that grammatical speech will not arise if there is no objective necessity for speech communication reveals one of the basic weaknesses of foreign language teaching. Students are often drilled and drilled on grammatical points, but seldom given the opportunity to communicate in a real situation: they rarely *need* to use the language. Perhaps real communication, and not just the formation of "habits" is what is necessary in the classroom. Communicative drills, in which there is no control of response and in which the teacher's reaction is to what is said and not how it is said might help solve the problem of the student who can zip through pattern drills and exams without being able to speak an original sentence.

The second function of language is to aid the development of thought processes. Thought and speech have a dialectical relationship; thought processes influence speech, and speech changes thought processes. The Soviets dismiss the theory that thought and speech are the same; that one always thinks in language; they also dismiss the theory that there is an absolute disjunction between speech and thought.

Vygotsky agrees with Piaget in Piaget's demonstration that the difference between adult and child thinking is qualitative and not quantitative: the ability to think evolves during the course of one's life. However, Piaget theorized that the evolution of thought is from autism (in which there is no adaptation to external reality) through egocentrism (concern only with self), to adult, socialized speech. During the period of egocentrism, speech is most often in the form of a monologue: Piaget concluded that this is purely individual speech, a symptom of an egocentric consciousness with no real function (Vygotsky, 1962). Challenging this analysis, Vygotsky performed several experiments proving that monologue is not "individual speech". "If egocentric speech is from a lack of socialization, then the less the opportunity for social contact, the greater should be the amount of egocentric speech." Observing children alone, with other children, and with adults, Vygotsky found that children talk the *least* to themselves in a problem-solving situation when they are alone and there is no possible illusion of social exchange; they used the most "egocentric speech" with an unfamiliar adult present. When obstacles to the activity were set up, monologue increased even more. Vygotsky's conclusion is that "egocentric speech" is really social, arising from the desire of children to work with adults. When the adult is not familiar enough for the child to get direct help from him in completing a problem, the child carries on a dialogue with himself to try to imagine what help that adult might give. The functions of monologue are to plan action, and to formulate the problem in the case of obstacles. Egocentric speech occurs when the child transfers the social forms of speech he has learned to inner personal functions, and is an integral part of the development of his thought processes. It helps him learn to solve problems for himself; in a later stage of development, it becomes inner speech. Thus Vygotsky sees development moving in an opposite direction to Piaget's theory: from social to individual speech (El'konin, 1958).

Experiments by A. M. Levshina also showed that egocentric speech is not a simple function of maturation. The child's first speech is synpraxic; the meaning of an utterance is dependent on the situation; but even this speech is directed toward another person and is social in function. According to Levshina's findings, speech evolves from synpraxic to "contextual" speech, in which meaning is revealed in the context of the utterance itself. This more complex form of speech cannot occur until the acquisition of grammar, which allows for the organization of speech (El'konin, 1958). Luria's experiment with the twins also attests to the fact speech cannot fulfill any other function than an accompaniment to action until a certain level of mastery of language is achieved. Only after acquiring a minimal knowledge of grammar could the twins use speech in narration and description and in planning future activity (Luria, 1959).

Since synpraxic speech is the simplest use of language, situational opportunities for speech communication in which meanings are partly determined by the external situation should constitute the first phase in practicing a foreign language. Only later, after grammatical structures have been learned, should the student be required to use language for the more complex tasks of describing, narrating, and planning.

One of the most researched aspects of the relation of language and

thought is the work on "generalization". Again taking the developmental point of view, Vygotsky sees the following stages. First, a word designates a "heap" of objects, grouped by chance. Asked to find all "cubes", the child picks out those objects closest at hand or simply randomly. The second stage is thinking in "complexes". Here, objects are associated under one name by real perceptual bonds, usually a single attribute. For example, blocks of a similar size may be grouped, or blocks of one color. The child may pick out all the triangles from a group at this stage, but his choice will be based on perceptual similarities, not on an understanding of the concept "triangle". Asked to describe the objects chosen, he will not be able to say that they all have three sides. Often then, a child and an adult will use the same word to name the same object; however the *meaning* of the word will not be the same for the child and the adult. True concept formation, typical of adult thinking, abstracts out common elements; similar objects are grouped according to a remembered system of attributes. (Vygotsky, 1962). Complex thinking establishes relationships between objects. For example, a child and an adult may see a dog and say "dog", but while the adult means a specific type of four-legged animal, the child may simply mean "something plushy."

Another way of talking about the development of thought processes is in terms of the first and second signal systems. The use of words differs in children and adults in that, initially, the word is part of the first signal system. The spoken word is an auditory stimulus causing a conditioned reflex just like any other external stimulus. When the adult names an object, usually accompanying his speech with gestures, the child has an orienting reaction toward the object named (Raevsky, 1958). Or, if asked to name a certain object, the child is rewarded for the correct word, this is still part of the first signal system. The second signal system is not operating until the child learns to react not to the sound but to the *meaning* of a word. This occurs when the child will not only name an object after being shown it or speak out of an emotional reaction, but will *voluntarily* produce words. He will talk before being shown an object when he wants it, or when he wants to evoke a reaction in the adult. (Raevsky, 1958). This occurs during the second year.

However, the second signal system is not suddenly acquired but also goes through developmental stages. In the two and three year old, the second signal system is not strong enough to overcome kinesthetic reactions. In one experiment, children were told to press a rubber bulb on a red light but not on green. The excitement of pressing the rubber bulb is too strong to be inhibited by verbal instruction. The child impulsively presses on both red and green, and does not see his mistake (Luria, 1963). In older children of about five, they verbalize the rule and follow it without being distracted by kinesthetic elements. Another experiment conditioned children of various ages to respond to a loud bell (first signal system), and then paired the bell with the statement, "There is no bell." In younger children, the response was not affected by the verbal statement; but the older the child, the greater was the inhibition of the response when the stimulus was verbally denied (Slobin, 1966, p. 383). At this age when speech stimuli can *regulate* external stimuli, the second signal system is fully

operative; the ability to use speech in this way is a uniquely human phenomenon.

In terms of neural connections, the second signal system is characterized by a special type of connection that is formed in an abrupt fashion. This type of connection underlies all human intelligent behavior. In animals and babies, conditioning requires many repetitions of a "stimulus-response", constant reinforcement is necessary. Using words, a response can become strong in a single trial (Luria, 1969).

Soviet research on the relationship between language and thought points up the fallacy of a too direct application of the ways children learn to speak to the second language learning situation of adults. Children's acquisition of language is part of a maturational process, and part of their process of mental development in which their mode of thinking is completely different in quality as well as in quantity from that of adults.

Language is acquired through the need for communication, through maturation of the nervous system, in an intimate interrelationship with the development of thought, and through adult instruction. Another aspect of Luria's experiment with the twins was to study the effect of speech instruction on speech acquisition. After the twins were separated, only one of the twins was given speech training. He spent time with an adult every day and was made to answer questions, to name objects, to repeat complete sentences, and to describe pictures. After 3 months, his synpraxic speech had dropped by 50% as compared with 28% for the untrained twin. After 10 months, the untrained twin caught up as far as percentages of synpraxic to narrative and planning speech, but the trained twin used more different kinds of sentence constructions and his sentences were more grammatical (Luria, 1959).

This situation is more analogous to foreign language learning than is first language acquisition in the normal child, in which maturational processes are also at work. Both the twins and the foreign language student are physically and intellectually capable of learning a language. Luria's study refutes the extreme view that students should be allowed to say anything anyway that they please, and that their own innate knowledge about language will see them through. Instruction by an adult clearly hastens the learning process.

In a study of the influence of instruction on concept formation, Vygotsky found that taught knowledge differs from that acquired through experience. Spontaneous concept formation is non-reflective whereas "scientific" or schooled concept formation is deliberate. Again, a dialectical relationship is seen to operate between development and instruction. Scientific concepts cannot be formed before the child has unconsciously learned to generalize; spontaneous concepts cannot become conscious until he has been *taught* to systematize his thoughts. Vygotsky draws a parallel between the relationship of spontaneous and scientific concept formation to the relationship between first and second language learning. First language learning is spontaneous and largely non-reflective. In second language learning, awareness about the language precedes the ability to produce speech spontaneously; but only after learning a second language does one become fully aware of one's native language. The two develop

in reverse directions, each influencing and benefitting the other (Vygotsky, 1962). This observation is a good argument for the use of Contrastive Analysis as a method of foreign language teaching.

Child acquisition of language: linguistic studies

Apart from the psychological studies, there are a lot of linguistic data on the acquisition of Russian as a native language that can be useful to the teacher of Russian as a second language. Many studies have been made of the order in which Russian children learn the various cases, prepositions, rules for gender agreement, and so forth. Results have shown that child speech is not an imitation of adult speech, but has a structure of its own. As one would expect, the child learns gross distinctions (in terms of both meaning and sound) before sub-dividing these into finer categories. For example, in learning noun classes, the feminine nouns ending in accented -a are learned first, then the masculine ϕ stem nouns, then the soft-ending nouns, and last the unaccented neuter -o ending nouns. The accusative case as direct object is learned first, then the genitive of possession, then the dative as motion toward, the instrumental of action, and the prepositional of place. It is not until 6 months later that the genitive of negation is learned (El'konin, 1958). Perhaps studies of this nature can be used in helping to decide the order of presentation of new grammatical material in foreign language teaching. Like the child, it would be easier for the student of a language with strange sounds to learn gross differences of sound and usage before being presented with the finer points. The native child's perception can be used to help us know which aspects of grammar are immediately obvious and which take even the native a long time to learn. For example, we expect the student to master the use of prepositions and the various cases each one governs in the first year of foreign language study, whereas in a recent Soviet study it was shown that native Russians have difficulty with prepositions until adolescence (Slobin, 1966, p. 367).

Conclusion

Soviet studies open up a whole new perspective on psycholinguistic problems. It is important for the American psycholinguist to know these studies first, because in the search for language "universals", a study of English alone will not suffice. Besides, one of the defects of American research on child acquisition of language is that it is most often done in a naturalistic setting and fails to take an experimental approach. (Carroll, 1961). Experimental evidence from Soviet studies proves that there is nothing magical about language acquisition. The ability to use language is "innate" only in that it reflects a further evolution of the animal brain, characterized perhaps by the fact that neural connections of the abrupt type (2nd system) can be formed. The much vaunted "feeling for language" that children have is nothing more than a simple orientation to the sound form of words, often caused partially by the instructive guidance of the adult (El'konin, 1958). Arising from a different philosophy and oriented toward different goals, Soviet "materialistic psychology" has yielded some valuable insights into the problem of the acquisition of language by children.

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The Output of Canadian Universities as Measured by Graduate Degrees

This paper presents the results of a study on the output of universities. The aim was to determine a homogeneous unit of graduate degrees granted by each province in proportion to the labour force, that is, to compare the graduate degrees/labour ratios (1) between Quebec and the other provinces and (2) between the French and the English universities in Quebec. The basic idea is that graduates represent a stock of human capital of benefit to the different provinces. A weighting index was calculated for the different university degrees, based on the years of schooling required for each degree. On the basis of graduate degrees/-labour force ratios it seems that Ontario has surpassed the other provinces in the output of highly qualified manpower. With regard to Quebec, it seems that the French universities have not yet attained the breadth of research and scientific training that doctoral level programs should include.

Higher education in Canada has seen an increase in student enrolments at an annual rate of ten to fifteen per cent during the past decade. In addition, the rate of expenditure for this level of education has vastly surpassed the rate of personal income, making higher education a major industry.¹ It has been estimated that activities related to universities and colleges in Canada now account for about five per cent of aggregate national economic activity.² This fact has led us to study the output of Canadian universities, as measured by graduate degrees conferred or by graduates produced, the latter representing a stock of human capital of benefit to the different provinces.

Aim of the Study

This paper presents the results of a study on the output of universities. The aim of the study was to determine a common unit of graduate degrees granted per province in proportion to the labor force, that is, to compare the graduate degrees/labor force ratios (1) between Quebec and the other provinces and (2) between the French-language and the English-language universities in Quebec.

The Problem

The problem is formulated as follows: (1) Do Quebec universities train enough qualified manpower in comparison with the other provinces? (2) Encouraged by funds, and by the Quebec government policy of catching-up (la politique de rattrapage), did the French universities reach the output of the English universities in the province?

Conceptual Framework

The output of universities is linked with qualified labor requirements. The present unbalanced cycle of demand for and supply of professional manpower should lead the universities to diversify their programs of study and adjust to the rapidly changing labor market and social conditions. Of course, no one doubts the need for the qualified training offered by universities. In its First Annual Report, the Economic Council of Canada emphasized that the availability of highly qualified manpower will be a very important factor in reaching economic objectives in years to come.³ Between 1956 and 1963, Canada granted only one doctorate degree for every thirty-three conferred in the United States, even in proportion to their respective populations. And despite the increase in student enrolments in humanities and in social sciences these last years, not one doctorate was granted in Fine Arts, Library Sciences, or Physical Education in Canada until 1969; further, not one Ph.D. in Economics was awarded in the French universities in Quebec until 1970-71, even with the catching-up policy. It is thus at the graduate level of studies that the question of training highly qualified manpower becomes critical.

Graduate schools are engaged in two major throughput activities: instruction and research. The latter produces more knowledge and at the same time makes a better use of the already existing knowledge. Since it is difficult to quantify the amount of research done in a university (the sum of money invested in research during a certain period can be documented or the ratio of publications to faculty members can be fixed, but that is not enough to measure this throughput), this study assumes that there is no graduate school worthy of the name without some research activity. Hence, the university output on the master's level and particularly on the doctoral level implies research activity and applied scientific training.

This study limits itself to the graduate level for the following reasons:

1. Significant differences do not seem to exist among Canadian universities in the offerings and output of bachelor degree programs. The annual registrations in universities have increased during the last decade, and student enrolment projections for the years to come show a continuation of that increase.⁴ The decrease in birthrate observed in most of the provinces will probably be neutralized by the growing request for university instruction. It even seems that the disparities in taking university studies between sons of well-to-do families and those not so well off have decreased.⁵
2. A fact that strikes a higher education analyst is that the importance once given to first university degrees is reserved today for graduate degrees. In a good number of professions, the first university degree holders are

considered only as technicians, and a master's degree is the minimum requirement for reaching a more important position.

3. It is at the graduate level that we can perceive differences in the university teaching and research activities and in the diversification of programs based on technological innovations. The training of highly qualified manpower is subject to this type of scientific diversification.

Do a master's of 1960 and one of 1970 reflect the same quality? This is a difficult question, and no ready answer suggests itself. Nonetheless, a certain logic implies that a degree granted in 1970 would be of higher quality than one awarded in 1960 if only because of the increased quality of the input and the improvement of the throughput (better trained teachers, improved teaching methods, the use of technological innovations, the accumulation of more knowledge by research) during this period. In any case, it seems that the quality of instruction is changing, and so are the individual and social benefits that derive from the formation of human capital. These things not being quantifiable, to assume a constant average quality of the student body by discipline seems reasonable.⁶ Thus, the study does not carry a judgment on the value of the degrees granted.

Method

The period covered is 1960-61 to 1969-70, which was the period of expansion of higher education in Canada. University degrees were examined as a whole without differentiating between men and women, even though certain graduates, especially women, will work part time or may not join the labor force at all. The data on graduates and the labor force were taken from annual publications of the Dominion Bureau of Statistics (D.B.S.), although for the interpretation of degrees granted in Quebec, statistics from the French universities were considered.⁷

In order to establish a relation with the structure of professions that are found in the labor market, a distinction was made between Education, the Humanities, the Arts, and part of Social Sciences on one hand and the Biological Sciences, Engineering, Mathematics, Physics, and the Health Professions on the other. Degrees in Economics, Administration, Urbanism, and Planning, although being part of the Social Sciences, were added to the applied sciences. This differentiation is in line with the new standardized classification used by the D.B.S., which presents the statistics by disciplines and professions rather than by university and subdivision in Arts and Sciences. In other words, a distinction was made between "economic" graduates (those who by their integration in the labor force will contribute to the economic growth of the country) and the "cultural" or the "humanities" graduates (those who will participate only indirectly in the economic development). This distinction affects the breakdown of the student body holding a master's degree only, because very few graduates in Canada received a Ph.D. in economics or in the administrative sciences during the period studied.

Since 1968-69, "licences" have been included in the undergraduate level as equivalent to a bachelor's degree. The French universities have joined the other North American universities by granting B.A., M.A., and Ph.D.'s. The "licences" that follow a degree in the same field of study are counted

TABLE 1
GRADUATE LEVEL DEGREES GRANTED BY CANADIAN UNIVERSITIES

Year	D.	Atlantic Provinces							Quebec							Ontario	
		Hum.	Sc.	Total	W.	U.D.	T.U.		Hum.	Sc.	Total	W.	U.D.	T.U.		Hum.	Sc.
1960	L.	-	-	-	-	-	-	-	301	62	363	0.7	254			59	
-61	M.	68	38	106	0.8	85			288	381	669	0.8	535			401	428
	D.	-	3	3	1	3	88		39	84	123	1	123	912		56	89
	L.	-	-	-		-			453	88	541	0.7	379			83	
1961	M.	57	37	94	0.8	75			307	370	677	0.8	542			452	481
-62	D.	-	8	8	1	8	83		35	71	106	1	106	1027		47	97
	L.	-	-	-		-			460	103	563	0.7	394			32	
1962	M.	75	65	140	0.8	112			330	430	760	0.8	608			510	536
-63	D.	-	3	3	1	3	115		33	93	126	1	126	1128		62	122
	L.	-	-	-		-			444	103	547	0.7	383			62	
1963	M.	86	89	175	0.8	140			344	401	745	0.8	596			626	624
-64	D.	1	5	6	1	6	146		46	112	158	1	158	1137		65	123
	L.	-	-	-		-			569	111	680	0.7	476			55	
1964	M.	107	101	208	0.8	166			288	525	813	0.8	650			778	752
-65	D.	-	14	14	1	14	180		54	121	175	1	175	1301		80	147
	L.	-	-	-		-			1031	70	1101	0.7	771			38	
1965	M.	120	99	219	0.8	175			294	694	988	0.8	790			908	970
-66	D.	2	15	17	1	17	192		47	124	171	1	171	1732		109	207
	L.	-	-	-		-			1180	72	1252	0.7	876			53	
1966	M.	130	106	236	0.8	189			453	766	1219	0.8	975			1213	1193
-67	D.	1	22	23	1	23	212		80	147	227	1	227	2078		103	230
	L.	-	-	-		-			1412	278	1690	0.7	1183			3	
1967	M.	160	146	306	0.8	245			660	612	1272	0.8	1018			1376	1377
-68	D.	3	18	21	1	21	266		69	160	229	1	229	2430		164	321
	L.	-	-	-		-			193	254	447	0.7	313			5	
1968	M.	162	190	352	0.8	282			633	740	1373	0.8	1099			1693	1570
-69	D.	1	36	37	1	37	319		79	157	236	1	236	1648		164	340
	L.	-	-	-		-			-	-	-		-			-	
1969	M.	240	185	425	0.8	340			962	872	1834	0.8	1467			2277	2050
-70	D.	4	42	46	1	46	386		79	181	260	1	260	1727		137	503

For key to abbreviations see page 125.

TABLE 1 (contd.)
GRADUATE LEVEL DEGREES GRANTED BY CANADIAN UNIVERSITIES

Ontario (contd.)				Western Provinces						Canada					
Total W. U.D. T.U.				Hum. Sc.		Total W. U.D. T.U.				Hum. Sc.		Total W. U.D. T.U.			
59	0.7	41		-	-	-	-			360	62	422	0.7	295	
829	0.8	663		167	281	448	0.8	358		924	1128	2052	0.8	1642	
145	1	145	849	2	32	34	1	34	392	97	208	305	1	305 2242	
83	0.7	58		-	-	-	-			536	88	624	0.7	437	
933	0.8	745		201	312	513	0.8	410		1017	1200	2217	0.8	1773	
144	1	144	947	9	54	63	1	63	473	91	230	321	1	321 2531	
32	0.7	22		-	-	-	-			492	103	595	0.7	417	
1046	0.8	837		270	356	626	0.8	501		1185	1387	2572	0.8	2058	
184	1	184	1043	5	102	107	1	107	608	100	320	420	1	420 2895	
62	0.7	43		-	-	-	-			506	103	609	0.7	426	
1250	0.8	1000		367	364	731	0.8	585		1423	1478	2901	0.8	2321	
190	1	190	1233	4	127	131	1	131	716	116	369	485	1	485 3232	
55	0.7	39		-	-	-	-			624	111	735	0.7	515	
1530	0.8	1224		418	397	815	0.8	652		1591	1775	3366	0.8	2693	
227	1	227	1490	13	140	153	1	153	805	147	422	569	1	569 3777	
38	0.7	27		-	-	-	-			1069	70	1139	0.7	797	
1878	0.8	1503		464	547	1011	0.8	809		1786	2310	4096	0.8	3277	
316	1	316	1846	23	170	193	1	193	1002	181	516	697	1	697 4771	
53	0.7	37		-	-	-	-			1233	72	1305	0.7	914	
2408	0.8	1927		579	506	1085	0.8	868		2375	2573	4948	0.8	3958	
333	1	333	2297	25	180	205	1	205	1073	209	579	788	1	788 5660	
3	0.7	2		4	-	4	0.7	3		1419	278	1697	0.7	1188	
2753	0.8	2203		665	621	1286	0.8	1029		2861	2756	5617	0.8	4493	
485	1	485	2690	45	226	271	1	271	1303	281	725	1006	1	1006 6687	
5	0.7	4		-	-	-	-			198	254	452	0.7	316	
3263	0.8	2610		708	703	1411	0.8	1129		3196	3203	6399	0.8	5119	
504	1	504	3118	84	247	331	1	331	1460	328	780	1108	1	1108 6543	
-	-	-		-	-	-	-			-	-	-	-	-	
4327	0.8	3462		1022	853	1875	0.8	1500		4501	3960	8461	0.8	6769	
640	1	640	4102	99	330	429	1	429	1929	319	1056	1375	1	1375 8144	

as the equivalent of a master's. In order to do justice to the teaching activities in the French universities, this study considers the "licences" as being above the bachelor's during the period in which they were counted in the master's.

Honorary doctorates are excluded, as are doctorates in dentistry and medicine, the latter being a first professional degree. Also excluded in this study are the diplomas and certificates awarded for courses of study sanctioned by a diploma or certificate, since their programs of study differ from those leading to a degree. While acknowledging that the Ph.D. is not the only quality indicator and that there are other titles than the doctorate degree in certain university disciplines and fields of study, the present study examined the M.A., M.Ed., M.Sc., Ed.D. and Ph.D. degrees only.

In order to determine a composite output measure or a common unit of degrees granted per province, a weighting index is calculated for the different university degrees, based on the years of schooling required for each degree. Hence, the weight of 0.7 units is calculated for a "licence" (seventeen years of schooling), 0.8 units is counted for a master's (eighteen years of schooling) and one unit is calculated for a doctorate (twenty years of schooling).⁹ The summation gives us a yearly total of units of degrees granted or of graduates produced per year in Canada as a whole, and also per province and regional groupings.

Table 1 presents data on degrees granted by Canadian universities. The Atlantic Provinces (New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island), Quebec, Ontario, and the Western Provinces (Alberta, British Columbia, Manitoba, Saskatchewan) form geographical or regional units, facilitating the comparison. This subdivision is also used in the publications of the D.B.S. Table 2 presents totals of the labor force for the month of October of each year. The annual list of graduates includes the graduating classes of May and October; thus, for statistical reasons, the active labor force report for the month of October of each year seems the best to use.

Data Analysis

"Licences" were awarded by the French universities in the province of Quebec and a number of them by the bilingual University of Ottawa. As mentioned beforehand, the decrease in number in 1968-69 is attributed to the fact that the "licences" were included at the undergraduate level as equivalent to a bachelor's degree and that the programs of study were restructured in view of the master's. Most "licences" were awarded in the humanities. The turning point was 1965-66, when 1,101 "licences" were granted in Quebec, as compared to 680 the preceding year. Probably, this was the result of the university catching-up policy brought about in the early 1960's. The fact that the master's replaced the "licence" can be seen in 1969-70, when 1,834 masters were conferred, as against 1,373 in 1968-69.

In the country as a whole, the number of degrees granted in the humanities increased each year (see Table 1, column Canada). From 1,381 master's awarded in 1960-61, the number grew to 4,820 in 1969-70; the number of degrees in sciences increased from 1,398 in 1960-61 to 5,016 in 1969-70.

TABLE 2

GRADUATE LEVEL DEGREES-LABOR FORCE RATIOS

Year	Atlantic Prov.			Quebec			Ontario			Western Prov.			Canada		
	U.D.	L.F.	R.	U.D.	L.F.	R.	U.D.	L.F.	R.	U.D.	L.F.	R.	U.D.	L.F.	R.
	(1)	(2)	(1)/(2)	(1)	(2)	(1)/(2)	(1)	(2)	(1)/(2)	(1)	(2)	(1)/(2)	(1)	(2)	(1)/(2)
Oct. 1961	88	613	0.144	912	1812	0.503	849	2386	0.356	392	1727	0.227	2242	6538	0.343
Oct. 1962	83	608	0.137	1027	1839	0.558	947	2403	0.394	473	1759	0.269	2531	6609	0.383
Oct. 1963	115	613	0.188	1128	1930	0.584	1043	2487	0.419	608	1811	0.336	2895	6841	0.423
Oct. 1964	146	622	0.235	1137	1938	0.587	1233	2546	0.484	716	1856	0.386	3232	6962	0.464
Oct. 1965	180	625	0.288	1301	2040	0.638	1490	2596	0.574	805	1918	0.420	3777	7179	0.526
Oct. 1966	192	638	0.301	1732	2149	0.806	1846	2740	0.674	1002	1992	0.503	4771	7519	0.635
Oct. 1967	212	653	0.325	2078	2181	0.953	2297	2815	0.816	1073	2042	0.525	5660	7691	0.736
Oct. 1968	266	650	0.409	2430	2241	1.084	2690	2961	0.908	1303	2143	0.608	6687	7995	0.836
Oct. 1969	319	659	0.484	1648	2290	0.720	3118	3002	1.039	1460	2191	0.666	6543	8142	0.804
Oct. 1970	386	668	0.578	1727	2335	0.740	4102	3137	1.308	1929	2272	0.849	8144	8412	0.968

Abbreviations: Table 1

D. = Degree
L. = Licence
M. = Master
D. = Doctorate

Hum. = Humanities
Sc. = Sciences
W. = Weighting index
U.D. = Units of Degrees
T.U. = Total Units

Abbreviations: Table 2

Prov. = Provinces
U.D. = Units of Degrees
L.F. = Labor Force in thousands
R. = Ratios of column 1/column 2

On the basis of graduate degrees-labor force ratios (see Table 2), it seems since 1968-69 that Ontario has surpassed the other provinces or groups of provinces in the output of graduates, although Quebec came first until 1967-68. In October 1970, the ratios were 1.308 units of graduates per thousand members of the labor force in Ontario, 0.849 units in the Western Provinces, 0.740 in Quebec, and 0.578 in the Atlantic Provinces. Quebec is even behind the Western Provinces; the effort of the latter in higher education seems to have increased significantly.

It might be that the compilation of "licences" at the undergraduate level decreases the number of graduate degrees for Quebec in 1968-69 and 1969-70. However, if we take a look at the number of units for Ontario and for the Western Provinces, we can see the following: the progress in Ontario dates to 1966-67, before "licences" were considered as equivalent to a bachelor's. As to the Western Provinces, from 1967-68 their output in doctorates has been higher than that in Quebec; these provinces progressed from 1968-69 to 1969-70 by thirty-two per cent.

In part two of the present study, we will compare the French and English universities of the province of Quebec. In the output of master's, the French universities drew ahead of the English universities during the whole period. The situation is different in the output of doctorates. Here McGill University surpasses the French universities put together (see Table 3). Between 1960-61 and 1969-70, McGill granted 1,123 doctorates, while the French universities awarded only 687. Especially in sciences, McGill surpasses by far the other universities in the province. It granted 916 doctorates, while Laval University, the University of Montreal, and the University of Sherbrooke awarded all together 334 doctorates, or seventy-three per cent by McGill and twenty-seven per cent by the French universities.

Summary and Conclusions

Ontario and the Western Provinces have been ahead of Quebec in the graduate degrees/labor force ratio these past few years. As for the comparison in Quebec itself, the French universities produce now more master's than the English ones, but McGill surpasses all the French universities put together in the output of doctorates.

Now, if we return to the principle noted beforehand, that the output of graduates, and particularly of doctorates, implies research activity and applied scientific training, Ontario and the Western Provinces surpass Quebec in the training of a highly qualified manpower needed for economic growth. One can say that Ontario is becoming the university research center of Canada.

With regard to Quebec, it seems that a good number of Ph.D.'s from McGill do not integrate in the economy of the province. Is this because of the graduate student population composition of that university (a significant number is made up of foreign or out-of-the-province students), or is it by the nature of circumstances (the French fact in Quebec)? If this is so, the problem of training a highly qualified manpower for this province becomes even more serious.

As for the catching-up policy set for the French universities, it seems

TABLE 3
EARNED DOCTORATES GRANTED BY QUEBEC UNIVERSITIES

McGill			Laval			U. of M.			M.D.C.			U. of Sh.			Quebec			
Year	H.	Sc.	T.	H.	Sc.	T.	H.	Sc.	T.	H.	Sc.	T.	H.	Sc.	T.	H.	Sc.	T.
1960-61	9	65	74	10	6	16	20	13	33	—	—	—	—	—	—	39	84	123
1961-62	16	54	70	4	3	7	15	14	29	—	—	—	—	—	—	35	71	106
1962-63	11	72	83	7	10	17	15	11	26	—	—	—	—	—	—	33	93	126
1963-64	18	87	105	9	9	18	19	16	35	—	—	—	—	—	—	46	112	158
1964-65	25	106	131	13	7	20	16	8	24	—	—	—	—	—	—	54	121	175
1965-66	18	88	106	16	17	33	13	19	32	—	—	—	—	—	—	47	124	171
1966-67	27	96	123	22	21	43	30	30	60	1	—	1	—	—	—	80	147	227
1967-68	29	130	159	16	12	28	24	17	41	—	—	—	—	1	1	69	160	229
1968-69	25	99	124	18	29	47	36	25	61	—	—	—	—	4	4	79	157	236
1969-70	29	119	148	20	26	46	30	32	62	—	—	—	—	4	4	79	181	260
Total	207	916	1123	135	140	275	218	185	403	1	—	1	—	9	9	561	1250	1811

Abbreviations:

- U. of M. = University of Montreal
- M.D.C. = Montreal Diocese College
- U. of Sh. = University of Sherbrooke
- H. = Humanities
- Sc. = Sciences
- T. = Total

that the latter have not yet attained the breadth of research and scientific training that doctoral level programs should include.

Presented at the Annual Meeting of the Canadian Learned Societies, Montreal, May 29, 1972.

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3. Economic Council of Canada, *First Annual Review: Economic Goals for Canada to 1970*. Ottawa: Information Canada, 1964, pp. 163-65.
4. Zsigmond, Z.E. & C.J. Wenaas, *Enrolment in Educational Institutions, by Province, 1951-52 to 1980-81*. Economic Council of Canada, Study No. 25. Ottawa: Information Canada, 1970, p. 13.
5. "Ontario Studies Accessibility," *University Affairs* (Ottawa), 1970, 9, p. 16.
6. Hettich, *op. cit.*, p. 60, asserts that applying adjustments to the measure of output, that is, to the quality of the student body, requires the same adjustments to the earnings foregone, which comes to the same.
7. *Survey of Higher Education*, D.B.S., Cat. 81-211, Part II, Degrees and Summary, 1959-61 to 1968-69; *Degrees, Diplomas, Certificates Awarded by Degree-Granting Institutions 1969-70*, Cat. 81-211; Université Laval, "Statistiques des diplômes de l'Université Laval," 1960-61 to 1967-68 (mimeographed); *Statistiques 1969-70 and 1970-71*; Université de Sherbrooke, *Statistiques 1967-68 to 1970-71*; Université de Montreal, *Statistiques 1967-68 to 1970-71*.
8. D.B.S., *Degrees, Diplomas, . . .*, p. 101 Zsigmond & Wenaas, pp. 275-76.
9. The Quebec teachers' collective agreement for 1967-68 mentions in an Appendix the recognition of degrees granted by different Canadian, North American, and French degree-granting institutions in terms of school years; see also *University Affairs*, 1969, Vol. X (8), pp. 16-17.
10. D.B.S., *The Labor Force*, Cat. 71-101, October 1961 to October 1970.

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Alienation: Meaning, Origins and Forms

Although the concept of alienation has been used widely, few attempts have been made at its precise definition or measurement. In this article, the author takes the position that alienation manifests itself in many different forms depending on the object, origin and mode of its expression. To label all unconventional youth as "alienated" is to oversimplify the underlying reality. Major theories of alienation from various perspectives are reviewed and their common themes and characteristics relevant to the study of contemporary student alienation are discussed. Two major forms of contemporary student alienation are identified: a retreatist passive form termed "psychological alienation", and an active radical form termed "active political alienation". It is claimed that these two forms are different in nature, origin and scope, involving estrangement from essentially different objects. A model and certain hypotheses related to different forms of alienation are suggested. It is argued that in spite of the attention political activist students have received recently, it is the passive conforming form of alienation which warrants greater attention.

Introduction

In recent years, the term alienation has been used extensively to characterize certain types of reaction to the stresses and strains of contemporary technological society. It has been used both to condemn the dissenter who refuses to support the values and structures of modern society, and the conformist, who over-conforms and follows exactly the socially prescribed behavioral norms but whose actions bring no personal meaning or fulfillment. The term has become so commonplace both in popular and professional usage and yet remains so nebulous that few can agree on its precise definition.

Yet it has become a platform slogan with politicians, an empirical question with academicians, and an area of great concern for the public. In everyday discourse it is said that children are alienated from parents, youth from society and people from government. Ecologists tell us that man is alienated from nature and our theologians and philosophers warn

us that we are alienated from our spiritual-essence. Josephson and Josephson (1962) call it a central problem of our time.

The term alienation has been applied to those who deliberately reject society and its institutions (Keniston, 1965) and those who are rejected by society (Marx, 1964). Some have used it to refer primarily to undesirable social and moral conditions (Durkheim, 1951; Merton, 1957); others have characterized it in terms of personal disintegration or identity diffusion (Erickson, 1959, 1968; Feuer, 1969b; Fromm, 1955, 1965). A few maintain that individual alienation may be an outgrowth of an individual's inability to cope with contemporary social and cultural demands and his earnest desire to invest his released energies to bring about the necessary social and cultural reconstruction (Becker, 1967; Flacks, 1967; Keniston, 1968).

Keniston has rightly stated:

All of this makes discourse about alienation difficult. Indeed, one would be tempted to abandon the concept altogether were it not for the certainty that the same problems of definition would then crop-up again with some cognate term like estrangement, disaffection, or detachment. Ambiguous terms suggest vague thinking which requires sharper distinctions—and not merely a new and equally vague synonym. (pp. 452-53).

Meaning of Alienation

In a general sense, alienation refers to feelings of estrangement or disaffection. A common assumption that is made in most usages of the term is that some natural, desirable relationship which once existed has ceased to exist. The underlying message invariably is that something is wrong somewhere and something needs to be done either to restore the lost connection or replace it with some other meaningful relationship.

Although alienation connotes general feelings of apathy and despair, nevertheless, the objects of alienation may differ: self, others, society and its institutions, so may the origins and the forms in which it manifests itself. The forms may differ primarily in subtle variations: powerlessness, meaninglessness, isolation, pessimism, repudiation, dejection, etc.

It follows from the above that the varieties of alienation are as many as are its objects and sources and to lump all these types together under a common label of "alienation" is to over-simplify the underlying reality. As Keniston (1965) has pointed out, it is important not only to specify precisely what we mean by alienation in a particular context but also to consider the following properties in its definition:

1. Alienation from what: or who is the object of alienation?
2. What form alienation takes: does it merely imply indifference or passive rejection of existing social and cultural norms as in the case of "hip-cult" or does it imply vehement opposition, or even open hostility, as in the form of anti-Vietnam War demonstrations?
3. Identify the mode in which it is manifested: is it an attempt on the individual's part to transform society, or is it an attempt towards self-transformation?
4. And finally, is alienation self-chosen or imposed? It is quite conceivable that these two forms are related: the person may reject those who have rejected him. But in many instances they are unrelated: for example, the Black Bourgeoisie accepts the norms of the white society from which it is excluded. (pp. 453-55).

TWO SCHOOLS OF THOUGHT

Before we attempt to define contemporary student alienation and analyse it on the above lines, it seems appropriate to present a critique of the different perspectives from which the concept has been studied in the past.

There are two major schools of thought in this area. The sociological point of view sees alienation as a *social problem*; a reaction to the stresses, inconsistencies and injustices of the social system. The alienated man is said to be the victim of his society; his alienation is imposed upon him by an unjust social order. Under this tradition, the role of individual personality and personal pathology is largely ignored.

The psychological theory of alienation, on the other hand, views it as developmental in nature, and traces its root cause to "*personal*" pathology. This tradition regards the individual as a victim of early childhood experiences and patterns of family relationships. The alienation of the individual is self-chosen and serves as a refuge from painful inter-personal relationships.

Each of these schools, however, has limitations. The psychologist overlooks the social reality which shapes individual lives; the sociologist ignores the importance of human experiences. The fact is that these both kinds of factors, and many others, are simultaneously at work.

In what follows, theories of alienation are considered from these two major perspectives: the sociological perspective (Durkheim, Merton, and Marx) and the psychological perspective (Erikson, Fromm, and Keniston).

Sociological Perspective

In sociological literature the term alienation may be traced to the words of *Emile Durkheim*, the French sociologist, who first used the term *anomie* to refer to a state of disturbance or normlessness in a collective order. By normlessness he means lack of consensus within the society about goals as well as behaviours expected of its members. This lack of consensus about values leads to the absence of societal "moral authority" operating over individuals.

According to Durkheim, two social variables—integration and regulation—jointly regulate suicide rates in a society. A society is said to be integrated to the degree to which its members possess a common conscience and manifest a sense of devotion to common goals. A high level of integration he calls *Altruism* and a low level *Egoism*. Extreme forms of altruism result in many suicides because it stresses individual renunciation. On the other hand, a high level of egoism may also cause suicides because it stresses individual self-interests rather than those of the collectivity. Between these two forms of integration lies a third social condition of moderate integration in which suicides are few (Durkheim, pp. 209-10 and 220-25).

By regulation, Durkheim implies the extent to which a society has moral authority or control over its members. He assigns the term *anomie* to a state of low regulation, where individuals are left to their own resources. In the absence of societal regulation, individuals become insecure and uncertain about themselves and their relationship to society. Such a state

leads to high rates of suicide. The other extreme where societal regulation is very high he calls *fatalism*. When a state of fatalism prevails, social regulation is intense: “. . . futures (are) pitilessly blocked and passions violently choked by oppressive disciplines.” (p. 276). In between these two extremes is a social condition where societal regulation is moderate and a consequent fewer number of suicides. Schematically, Durkheim’s ideas work out as follows:

TABLE 1
SUICIDE RATE UNDER VARYING SOCIAL CONDITIONS

		Integration →		
		Low	Moderate	High
Regulation ↓	Low	Egoism & Anomie Very High 1	Anomie High 2	Anomie & Altruism Very High 3
	Moderate	Egoism High 4	Inter- mediate Low 5	Altruism High 6
	High	Fatalism & Egoism Very High 7	Fatalism High 8	Altruism & Fatalism Very High 9

(American Sociological Review, 1965, p.878).

To Durkheim, societal stability that grows out of strong moral regulation is very important for controlling societal normlessness. When there is lack of social equilibrium, the individual has no means of self-regulation or sense of collective support. He may experience personal normlessness or anomia. (The term anomia is frequently used to refer to the individual sense of normlessness, whereas, anomie is used only to describe normlessness at the societal level). Individual anomia (alienation) may be defined in terms of states of mind which accompany social disintegration: feelings of normlessness, powerlessness, meaninglessness—feelings that frequently lead to suicide.

Societal disintegration may cause psychological anomia but it is important to note (as is clear from the above diagram) that societal over-

regulation may also lead to individual alienation though different in nature, that is, alienation which manifests itself in over-conformity or ritualism.

Robert Merton defines individual alienation “as a symptom of dissociation between culturally prescribed aspirations and socially structured avenues for realizing those aspirations” (Merton, 1957, p. 134). Merton considers such a dissociation prevalent in American society because culturally approved means for reaching the desirable goals—success and money—are not available to all its members. People, therefore, use illegitimate means to reach the primary goals. Merton maintains that dissociation is characteristic of American society as a whole, the nature and degree of the dissociation, however, are not equally distributed throughout the society; it is more visible among the lower classes than among those of the more privileged upper classes.

This hypothesis of differential pressure of goal-means disjunction on various social strata enabled Merton to identify five types of deviant behaviour (Table 2).

TABLE 2
TYPES OF DEVIANCE

	Cultural Goals	Institutionalized Means
1. Conformity	+	+
2. Innovation	+	-
3. Ritualism	-	+
4. Retreatism	-	-
5. Rebellion	±	±

NOTES: + = acceptance, - = rejection, ± = rejection and substitution,
(Merton, 1957, p. 140).

Individual conformity to societal goals and means is the most common adaptation in any society and is, in fact, a measure of its stability. Societies which fail to command conformity from their members cannot long survive.

Innovation is also very common. This response occurs when the individual has assimilated the cultural emphasis upon the goals without internalizing the institutional norms in terms of means for its attainment. Merton recognizes that the American culture makes incompatible demands on those located in the lower reaches of the social structure. On the one hand, they are asked to orient their conduct towards the prospect of wealth and on the other, they are denied effective opportunities to do so institutionally. The consequence of this structural inconsistency is a high rate of deviant behaviour among the lower classes.

Ritualistic forms of adaptation involve the acceptance of institutional means, but the abandonment of cultural goals, for example, of “getting ahead” in the world. We should expect this type of adaptation to be fairly frequent in a society which makes one’s social status largely dependent upon one’s achievements. If one should expect lower classes to exhibit

Adaptation II, i.e., innovation, the lower middle classes are heavily represented among those making Adaptation III—ritualism (what Fromm calls over-conformity).

Retreatism involves a rejection of both goals and means and is the least frequent form of deviance. People who choose this type of adaptation are, in the sociological sense, the true aliens. In this category fall some of the psychotics, chronic drunkards and drug addicts. They have given up on culturally prescribed goals and their behaviour is out of tune with institutional norms; they are in fact the most extremely psychologically alienated or anomic individuals in society.

Rebellion envisages a complete rejection of existing goals and structures and substituting new ones in their place. In rebellion, allegiance is withdrawn from the existing social structure because it is seen as a barrier to desirable goals. In order to engage in organized political action, allegiance must not only be withdrawn from the existing social structure but must be transferred to new groups committed to new ideologies.

Merton's analysis of alienation is similar to Durkheim's in that he considers the primary source of all alienation to be the anomic condition of the society. However, Merton analyzes the effects of alienation and anomie in terms of the structure of the social system and recognizes that social anomie has different effects on individuals occupying different positions within the structure.

Merton's theory about the social sources of individual alienation marks a significant contribution. Nevertheless it would be interesting to test the hypothesis that the incidence and degree of alienation are differentially distributed among different social classes. Alienation may be as widespread among the upper classes as among the lower classes. The nature of alienation may, however, be different. Among the lower classes it could be more external in nature, the object of alienation being society and its institutions; among the upper classes it could be more internal in form, consisting of feelings of isolation, depersonalization, doubt, etc.

The political theory of "alienation" is generally traced to the writings of *Karl Marx*, particularly to his early economic and philosophic manuscripts (also known as the Paris Manuscripts). Marx, in his theory, focuses primarily on the alienation of the worker which he traces to the economic and political policies of capitalism. His central thesis is that under capitalism, the worker has no control over the process or the product of his labour, and is therefore not able to produce what he considers to be an expression of his creativity: he creates a commodity which sells in the market. Work becomes merely a means to other ends, namely, wages and making a living, and loses any personal meaning or relevance for the worker. Furthermore, since the product the worker produces sells for more than he himself can afford to pay for it, he begins to deify the products of his own creation. In contemporary western world, this deification results in commercialism. Thus, the very product over which the worker once had control confronts him as an alien and a powerful thing, controlling his work motivation. This primary loss of relationship to his work results insidiously in the worker's estrangement from himself and his fellow workers.

According to Marx, alienation of the worker is not chosen but imposed upon him by the social system; its victims are usually unaware of the extent of their detachment from their work, themselves or fellowmen. Paradoxically, alienation begins to cease once the worker becomes aware of it: this awareness activates "class-consciousness" among the proletariat which pushes them to create a classless society where the worker is no longer alienated from his labour.

In Weber's work, we find an extension beyond the industrial sphere of the Marxian notion of powerlessness. Of this extension, Gerth and Mills write:

Marx's emphasis upon the wage worker as being "separated from the means of production" becomes, in Weber's perspective, merely one special case of a universal trend. The modern soldier is equally separated from the means of violence; the scientist from the means of inquiry; and the civil servant from the means of administration. (1946, p. 50).

Psychological Perspective

The term anomie has been employed both in social and psychological contexts. However, it is important to note that social anomie and psychological anomie are theoretically different in scope and origins involving estrangement from essentially different objects (Nettler, 1957). In assessing social anomie, the individual's feelings are measured with reference to the social system whereas psychological anomie is measured in terms of the individual's feelings about himself.

Erikson's concern with identity formation in adolescence and early adulthood stems from his theory about "ego-qualities" that emerge from critical developmental stages of life. He characterizes adolescence as a period of great stress for young people. The developmental crisis of this period centers around the issue of identity. Identity, to be sure, does not originate (and does not end) in adolescence: from birth onward, the child learns to identify with certain prototypes and to reject others. This process, however, becomes critical in youth when the ego is called upon to assimilate childhood identifications with the individual's developed capacities. Thus "identity formation . . . arises from the selective repudiation and . . . assimilation of childhood identifications" (Erikson, 1968, p. 159). If successful, a coherent sense of who I am, what I can do, what meaning I assign to life develops.

An individual's sense of identity is in part an outgrowth of his ability to assimilate dominant social practices with his individual identity development. In this way the concept embraces psycho-social character. Man's ". . . psycho-social identity . . . depends on a complementarity of an inner (ego) synthesis in the individual and of role integration in his group" (1968a, p. 61).

Failure to integrate earlier identifications results in what Erickson terms "identity (role) confusion", and a prolonged identity confusion deprives society of the devoted application of energies of youth.

Another way of focusing on an identity, which is not truly integrative, is a premature escape into the comforts of "negative identity", or repudia-

tion of any identity. A negative identity remains an unruly part of the total identity. In addition, man tends to "make his own" the negative image of himself imposed on him by superiors and exploiters (1959, pp. 30-31). Erikson's description of parents who foster such negative identity is as follows:

These mothers love, but they love desperately and intrusively. They are themselves so hungry for approval and recognition that they burden their young children with complicated complaints, especially about their fathers, almost pleading with them to justify their mother's existence by their existence. They are highly jealous and highly sensitive to the jealousy of others . . .

The fathers although unusually successful and often outstanding in their fields do not stand up against their wives at home because of an excessive dependence upon them, in consequence of which the fathers also are deeply jealous of their children . . . (Erikson, 1968, p. 178).

The notable features of Erikson's theory about "ego-formation" are ego strength, role integration, continuity, ideology, and commitment, the very ingredients Keniston found lacking in his "uncommitted" Harvard students.

Fromm in his analysis of the contemporary social character focuses primarily on man's alienation from himself. His major thesis is that man has gained freedom *from* the dogmas of an earlier age but he has failed to use this freedom *to* realize his individual self. He has not learned to function and accept himself as he is, but plays a role for the benefit of others, i.e., he has become a psychologically alienated conformist.

Alienation means a mode of existence in which the person experiences himself as an alien. He has become, one might say, estranged from himself (Fromm, 1955, p. 120).

To be self-alienated, in the final analysis, means to be something less than one might ideally be if the circumstances in society were otherwise: to be insecure, given over to appearances, to overadapt to other's wishes. David Riesman's discussion of the "other-directed" fits in exactly with Fromm's description of the psychologically alienated conformist:

For what is at stake is that the child learns that nothing in his character; no possession he owns, no inheritance of name or talent, no work he has done is valued for itself, but only for its effect on others (Riesman, 1950, p. 49).

Fromm would have an individual actualize his real-potentials in order to gain closeness and integration with himself and others, at a deeper and less arbitrary level.

Keniston's theory of alienation is based on his research conducted on the alienated Harvard students (1965). While Keniston started with a social and cultural definition of alienation, his ultimate analysis turned out to be more psychological in nature. He defined these alienated intellectuals in terms of their "explicit rejection of what was seen as the dominant values of American culture" (Keniston, 1968, p. 326). The empirical cluster of attitudes termed the "alienated syndrome," descriptive of these students, consisted inter alia of distress, pessimism, avowed hostility, interpersonal, social, and cultural alienation and vacillation.

Keniston traces the psychological alienation of his subjects to the patterns of family organization and interrelationships. The parents of the alienated seem to have been frustrated and disappointed with their

married life. "The mother's talents and emotionality found little expression with her marriage; the father's idealism and youthful dreams were crushed by the realities of his adult life" (Keniston, 1968, p. 337). The frustrations and disappointments experienced by parents were played out with, and over, their children.

The mothers sought in their sons the satisfaction they should have found with their husbands; they bound their sons to them with heavy ties of guilt and dependency. The fathers were seldom shown adequate; they were largely absent from their sons' psychological development. Moreover, these fathers suggested through deed and word that their sons should not become like them. The mothers not only fostered pathological attachment of their sons to themselves, but made them reject any positive identification with their fathers.

Keniston's description of his alienated students suggests that psychological alienation is an outgrowth of the son's tragic success in the oedipal conflict and of confused parental identification. Yet the disastrous victory of the sons in the oedipal conflict instilled in them a deep dislike of all rivalry and competition.

The above discussion on the theories of alienation leads to an important issue: is psychological alienation, as Marx would put it, a reflection of social reality or is the sociological alienation, as Freud would put it, a reflection of psychic contents? The answer perhaps is that both are true, depending on the locus of reality. The central question as Roszak would frame it is: which type of alienation is the real one, or which is the substance and which is the shadow? The following discussion on the contemporary student alienation may provide some partial answers to the above question.

CONTEMPORARY STUDENT ALIENATION

Definition

Contemporary *student alienation* may be defined as a pattern of behaviours or attitudes "freely" chosen by young people who explicitly reject what they perceive as the dominant values or norms of society. As Keniston has noted:

. . . the alienated are different from their non-alienated friends; they differ not in what they do but in how they do it. Alienation expresses itself most characteristically as a style of life, a special attitude brought to ordinary activities, a special relationship to the crucial events of one's life (Keniston, 1965, p. 86).

Typology of Alienation

Contemporary student alienation expresses itself in two major forms: a passive retreatist response, the defining feature of which is withdrawal from and rejection of traditional social values, norms and institutions (for example, the hippie sub-cultures); and a more active radical response, the defining characteristic of which is participation in a demonstration or group activity that concerns itself with some political, social or ethical principle (for example, student political movements).

These forms of contemporary alienation puzzle many people insofar as

the youth most involved do not seem to be the type one would expect to be alienated. Almost every objective study has shown that these young people come from economically privileged, professional and educated families. They are endowed with superior intelligence, high talents and healthy bodies (Katz, 1965, Peterson, 1966, Mehra, 1971). Their grievances against the society appear to be based on no socio-economic deprivation (as described by Merton and Marx). In this sense their alienation cannot be explained by simple social hardships.

The "stereotype" of alienated youth, as commonly described, is both a "Bohemian" and a "political activist." In appearance he is bearded, long-haired, dirty and unkempt, and comes across as profoundly disenchanted with society. He is popularly portrayed as an experimenter in Zen and drugs and unconventional in his daily behaviour and life style. He is described as personally frustrated and unhappy, often deeply maladjusted as a person and a failure in life.

Sources

The sources of alienation are generally traced to the loss of certain traditional values. A common assumption invariably made is that the breakdown of family life, high rates of divorces, softness of modern living and above all parental over-indulgence and spoiling have contributed to the prevalence of youth alienation. It is said that these dissenters, brought up in undisciplined homes by parents unsure of their own values and philosophies, are playing out their frustrations and anger against the older generation, against all authority, and against most established institutions (Keniston, 1968, p. 299).

Similar arguments are found in the writings of some contemporary scholars. *Lewis Feuer* (1969) has indicated that political activism of the alienated youth is generational and psychological in origin. He attributes student activism to unresolved oedipal conflicts and negative identification with parents. He calls it a "politics of the unconscious."

Emotions issuing from the student's unconscious and deriving from the conflict of generations impose or attach themselves to the underlying irrational directions (p. 8).

For Feuer, psychological alienation as represented by the "hippie sub-culture" and activist political alienation as represented by "student political movements" are inseparable.

Richard Flacks (1967), on the other hand, asserts that student political alienation is not derived from oedipal conflicts with authoritarian parents but rather is a direct expression of a perceived discrepancy between the values imposed by parents and the prevailing practices of the society. Some of these activists are the children of liberal radical parents who emphasize and value humanitarianism, intellectualism and romanticism in their personal lives. Thus, the activists are, in fact, living out the values of the parents and in so doing are forced into conflict with society.

According to Flacks, activist political alienation is not born out of rejection of parental values, but rather out of successful socialization.

In this way, the values that an earlier generation espoused in an abstract way have become embodied as personality *traits* in the new generation . . . In this

sense, the students who engage in protest or who participate in “alienated” styles of life are not “converts” to a deviant adaptation, but people who have been socialized into a developing cultural tradition (Flacks, 1967, p. 63).

While Flacks focuses on ‘generational continuity,’ Feuer postulates ‘generational conflict’ as the underlying reason for contemporary student political activism. Feuer’s description of the alienated activist is similar to Keniston’s characterization of the ‘uncommitted’ except that Keniston’s uncommitted were apolitical nihilists whereas Feuer’s radicals are political activists. Flacks’ description of activists is reminiscent of Keniston’s ‘young radicals,’ though one notices distinct differences in the family backgrounds and political orientations of the two. A brief description of Keniston’s “uncommitted” and the “young radicals” would help to bring out the distinguishing features of the two forms that student dissent has taken in recent years.

Distinguishing Features

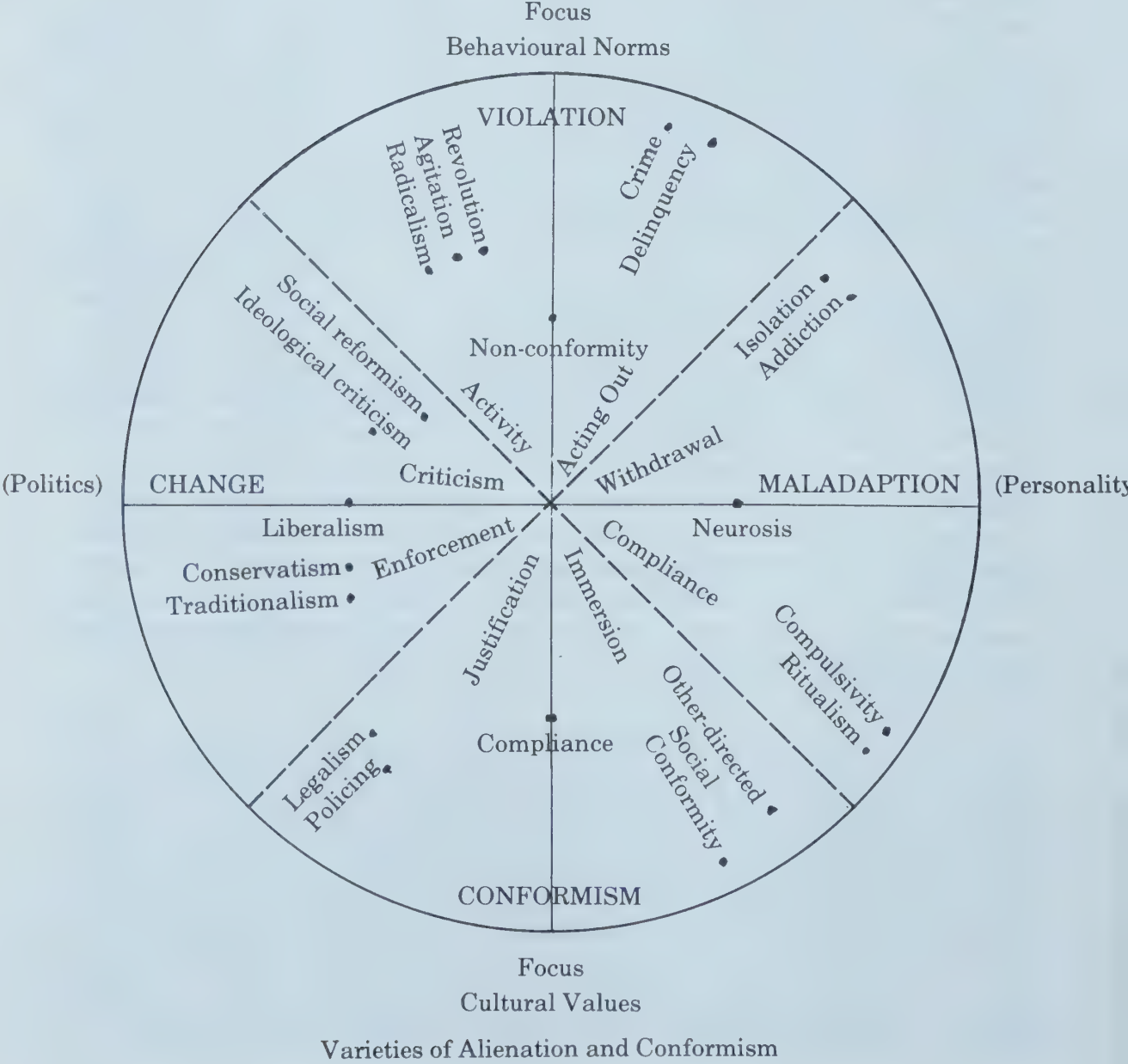
Keniston characterizes his activists as highly committed to some social or political cause. Philosophically, the activist believes that the traditional social and political institutions in his society have failed and must be replaced by new participatory and decentralized institutions. The psychologically alienated student, in contrast to the politically optimistic protestor, is too pessimistic and unconcerned to engage in any kind of organized protests. His demonstrations of dissent are private: through nonconformity of life-style, behaviour and ideology, through personal experimentation in hallucinogenic drugs and through efforts to enhance his own subjective experience, he shows his disapproval of and disinterest in politics. Whereas the activist is interested in social reform and reconstruction, the alienated is convinced that society is beyond restoration and considers “dropping out” the only alternative solution. Thus, despite occasional agreement in principle between the alienated and the activist, cooperation in practice between the two has been rare. Activist accuses the alienated of “irresponsibility”, while the alienated is convinced that the activist is “moralistic,” “uptight” and “uncool” (Keniston, 1968, pp. 302-304).

Keniston’s studies of the uncommitted and the young radicals led him to suggest that political alienation is the diametric opposite of psychological alienation. Whereas activism denotes commitment, alienation denotes lack of concern; whereas activism indicates an optimistic confrontation with social injustice, alienation indicates a pessimistic negativism and nihilistic political apathy.

Hypotheses on the Measurement of Alienation

It is quite conceivable from the above discussion that alienation runs along a continuum, one end of which may be characterized as violation or repudiation of social and cultural norms and the other end over-adaptation to these norms. It is also plausible that alienation generates active as well as passive response. Extreme radical activities (Marx’s rebellion) would be the active response, and extreme psychological withdrawal (Merton’s retreatism) the passive response, respectively, generated by the end denoted by rejection. On the other hand, repressive policing activities (Durkheim’s fatalism) may be conceived as the active

response and compulsive psychological conformity (Fromm's conformism and Merton's ritualism) as the passive response, respectively, generated by the end we have called over-adaptation. In between these two extremes would lie a state of moderate alienation in which an individual accepts some of the social and cultural values while rejecting others (Durkheim's state of moderate integration as well as regulation, see column 5, Table 1). Since alienation runs along a continuum, it is possible to measure a person's degree or extent of alienation on the basis of his response scores to a set of variables measuring dissent vs. conformity to social and cultural norms. We also feel that it is possible to determine the nature of a person's alienation, that is, whether his alienation is sociogenic or psychogenic in nature by including in the measures indices for several types of alienation. The above formulations can be represented as shown in the diagram below. This is, in fact, a simplified—and modified to some extent—version of Keniston's varieties of alienation and conformism (1965, pp. 470-471).



Research results of an empirical study (Dienst, 1971) completed recently at the Centre for Research and Development in Higher Education, University of California, Berkeley, lend partial support to some of our hypotheses. Evelyn Dienst, in her research on a sample of college students, delineated (using the factor analytic techniques) two distinct and independent dimensions of student alienation: psychological alienation, and activist political alienation. Psychological alienation was found to be associated with variables represented on the subdimensions powerlessness, isolation, meaninglessness and normlessness, and activist political alienation was related to activities associated with left-wing radical activism in the United States. While the items used in the measurement of psychological alienation referred to the individual's feelings about himself and his relationships with others, the items selected to measure activist political alienation were phrased to describe the individual's feelings about the social system and its policies.

Dienst found a positive relationship between the activist political dimension of alienation and various measures of intellectuality, liberalism, interaction with others, and positive self-image, and a negative relationship between the psychological dimension of alienation and measures of psychological stability, self-esteem, and ability to interact with others. She also discovered the psychological dimension to be consistent with passive retreatist and the active political dimension compatible with active radical interpretations of alienation.

Dienst's description of the personal characteristics of the young activists suggest that they are unusually psychologically healthy and personally integrated people (see also Heist, 1966, and Trent and Craise, 1967). As Bay (1967) has argued, some degree of political and social activism is, perhaps, symptomatic of psychological health and a necessary condition for a dynamic and viable society.

The work of McLeish (1968) on College of Education and University students in Britain and on non-University post-secondary students in the Province of Alberta lends strong support to these findings. For example, university students are classified into one central and eight bipolar types (McLeish, 1968)—quietists; enthusiasts-rebels; oracular-participatory; tutor centred-student centred; group oriented-individually oriented—on the basis of their expressed attitudes to the teaching methods lecture, tutorial and seminar. This attitudinal typology is found to be congruent with various personality structures and social-political attitudes. In particular, “enthusiasts”, who express a high regard for all three teaching procedures, are found to score high on measures of neuroticism and extraversion whereas “rebels”, who rate all three teaching methods at the low extreme are, relatively speaking, tender-minded radical introverts *with high scholastic standards*. In other words, the latter group, the (so-called) “rebels” or “alienated” students, are relatively stable and oriented towards relevant understanding whereas it is the “enthusiasts” or “conformists” who must be classified as insecure and maladjusted. The intermediate group, or “quietists”, are extremely stable, tough-minded conservatives with low commitment to ideas and with a high power need.

Keniston (1968) observes that any attempt to repress constructive polit-

ical activism among young activists would mean losing a considerable reservoir of talent which could otherwise be used to bring about much desired social change. Political activism may even encourage and draw into its circle some of the romantic alienated students by offering them some positive and meaningful directions in life and thereby lessening their personal feelings of isolation, ineffectuality and meaninglessness.

The psychologically estranged youth who manifests his alienation either by over-conforming to the social and institutional norms or simply dropping out of the mainstream of social life deserves public concern and attention.

Implications

Few campus issues today concern the public or the intellectual community as much as the recent student political activism and the new and deviant lifestyles on many university campuses. Only a decade back, social scientists were decrying the silence and apathy of college students towards national and international issues. Today, they are perplexed over the much publicized upsurge in student dissent. University administrators are under increasing political pressure to deal with the problems emanating from the so-called radical fringe. Little concern—public or political—has been expressed with regard to alienation among the “silent majority” which involves what Fromm has described as passive and ritualistic social conformity.

It is important to note at this point that political dissent is by no means widespread among college students. Every objective study or survey shows, on the contrary, apathy and despair far more dominant than political dissent (Katz, 1967; Peterson, 1966). Even at those colleges where political activism is visible, the vast majority of students—probably over ninety-five percent—remain interested onlookers or opponents of conflict rather than active participants. At most college campuses, student activism is not visible at all. Student political dissent, though limited to a small minority, becomes highly visible because these students use the mass media in a very effective way and consequently succeed in their attempts to make themselves and their causes noteworthy.

In view of the increasing enrolment in colleges and universities of students coming from the lower half of the socio-economic strata, one might anticipate an increase in passive and conformist forms of alienation on college campuses in the coming years. It becomes incumbent upon university administrators to deal with such nondisruptive but substantive forms of alienation as assiduously as they have assumed the responsibility to deal with the manifest political forms of alienation. As Dienst has observed it is usually the activist political alienation which excites attention among the college administrators, whereas among the psychologically alienated, the quiet conformists or those who drop out, go unnoticed.

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Auditory Segmentation and Auditory Blending in Relation to Beginning Reading

Tests in auditory segmentation and auditory blending were administered to 126 grade 1 and 2 subjects. Assessment was made of the development of skills in both areas. Relationships between the tasks were examined as a function of grade, type of unit, and length of sequence, and success in auditory segmentation and auditory blending were compared to reading achievement and mastery of other reading subskills. Results indicated that auditory blending, a higher-order, more complex skill than auditory segmentation, is also more closely related to reading success than is auditory segmentation. Success in auditory segmentation is heavily dependent upon knowledge of word meanings and awareness of the stress and intonation patterns inherent in the spoken language, while immediate memory is a crucial factor in auditory blending. For primary age children, the natural perceptual unit of spoken language is more likely the syllable than the phoneme. Phonemes must be learned as abstract concepts, and acquisition of these concepts is a critical factor in success in beginning reading.

The importance of auditory perception in beginning reading has been well established at a general level. A recent study of phoneme discrimination revealed that, by the year end of grade 1, few children experienced difficulty in discrimination of single phonemes and suggested that examination should be made of the subskills of auditory perception which had received insufficient analysis and study (Smythe, Hardy, Stennett, & Wilson, 1971). Two of these subskills, auditory segmentation and auditory blending, were the subject of this study.

Auditory Segmentation

Auditory segmentation involves the ability to segment utterances of various types and lengths into subunits of various types and sizes, e.g.,

sentences into words, words into syllables, and words into phonemes. Some disagreement currently exists regarding the natural perceptual units of spoken language. Piaget's early work revealed that sentence awareness precedes awareness of individual words (Piaget, 1955). Savin and Bever (1970) determined that adults could segment speech utterances into phrases, words, syllables, and phonemic and phonetic units, but questioned the order in which these units are normally recognized. Whereas linguists have traditionally studied the recognition of word boundaries (Fries *et al.*, 1966), recent studies examining the development of natural perceptual units of spoken language have suggested that these units may be different at various stages of language development.

Several investigators have attempted to assess young children's ability in auditory segmentation. Marsh (1969) estimated that children segment speech into 2- or 3-word units, probably at the level of phrase boundaries. Huttenlocker (1964) and Karpova (1966) found children from 3½ to 7 years of age unable to segment sentences into words but Karpova's Ss were able to make simpler divisions into subject and predicate. Elkonin (1963) found that 5- and 6-year olds were unable to segment words into phonemes. Dolch and Bloomster (1937) and Bruce (1964) claimed that children under 7 years are unable to master the task of phonemic segmentation. Holden and MacGinitie (1969), attempting to evaluate kindergarten children's ability to segment sentences and groups of words to individual words, discovered that function words were more difficult to segment than content words, and that a child's sensitivity to the rhythmic aspects of an utterance influenced the way in which he segmented it. Rosner (1971), who gave a group of non-reading grade 1 children daily auditory training designed to teach them to add, omit, substitute, or rearrange the phonemic elements of spoken words, comparing them to a control group given no similar training, found the training group superior in both auditory analysis and word recognition ability.

It is unclear, therefore, what the nature of the perceptual units of spoken language is, and in what sequence children acquire the ability to identify and segment these units in speech utterances. The discrepancies in the above findings with children may be a function of the various ages of Ss, methods of assessing segmentation skills, and type of unit of segmentation (words or phonemes). Very little investigation has been made of the relationship between skill in segmentation and success in beginning reading.

Auditory Blending

Auditory blending is the ability to produce a word by synthesizing its component sound elements (syllables or phonemes), when they are presented orally at ¼ sec. intervals (Chall, Roswell, & Blumenthal, 1963). Although auditory blending has not been included as a basic instructional skill in beginning reading programs, specialists in the field of reading disability have recognized the importance of this skill in remedial reading instruction. Reynolds (1963) found a positive relationship between auditory blending skill and word recognition ability in grade 4 children. Chall *et al.* (1963) found that auditory blending ability and oral and silent

reading ability were positively related at all grade levels from 1 to 4. The strongest relationships were between auditory blending and oral reading ability, specifically word analysis skills. In a study involving grade 4 children with reading difficulties, Hardy (1965) demonstrated both that skill in auditory blending could be improved through appropriate instruction and that oral reading ability (word recognition) was enhanced as a result. Flynn and Byrne (1970) found educationally advanced grade 3 children superior to educationally retarded Ss in auditory blending.

Brown (1970), in a study of the effects of certain linguistic dimensions on auditory blending performance in pre-schoolers found that syllables were easier to blend than phonemes, consonant-vowel breaks (e.g., n-o) were more difficult than vowel-consonant breaks (e.g., u-p), and that training in syllable blending did not transfer to phoneme blending performance.

Thus, while the relationship between auditory blending and success in reading ability (and in particular word recognition skill) is well documented, the early development of auditory blending ability has not been extensively investigated.

The present study was designed to: (1) assess the development of skills in auditory segmentation and auditory blending in primary school children; (2) study the relationships between these skills as a function of grade level, type of unit and length of sequence being segmented or blended, and (3) relate the abilities in auditory segmentation and blending to measures of other subskills involved in beginning reading.

Method

Subjects

Ss of the study were 126 grade 1 and 2 children enrolled in Lorne Avenue Public School, in London, Ontario. This school is located in the inner city and contains a high proportion of children from lower socioeconomic backgrounds. The 81 grade 1 Ss, 43 boys and 38 girls, had a mean age of 6.4 years. The 45 grade 2 children, 26 boys and 19 girls, had a mean age of 7.6 years.

Test Development

Auditory segmentation. The auditory segmentation test (AST) consisted of 3 subtests, i.e., sentences into words (SW), words into syllables (WSi), and words into phonemes (WP). SW was made up of 15 sentences varying in length from 3 to 7 words, with 3 sentences of each length. The sentences were constructed of familiar, frequently occurring words in order to reduce the memory demands of the task. WSi contained 15 words of 2, 3, and 4 syllables, with 5 of each length. The 15 words in WP were of 2, 3, and 4 phoneme lengths, again with 5 of each length. The words in both tests were chosen on the basis of familiarity and ease of articulation. The items used in AST are included in Table 1 in order of length of utterance for each subtest. However, in testing, the order was randomized by length within each subtest.

Auditory blending. The auditory blending test (ABT) consisted of 2 subtests, i.e., syllables to words (SiW), and phonemes to words (PW). The

15 items of SiW were of 2, 3, and 4 syllable lengths, with 5 at each level, chosen on the basis of familiarity and ease of articulation. PW contained 13 2-phoneme, 12 3-phoneme, and 6 4-phoneme words. These items were composed of representative phonemic components and included all possible combinations of single consonants, consonant blends, consonant digraphs, single vowels, controlled vowels, vowel blends, and vowel digraphs. Table 2 contains the items used in ABT in the order in which they were presented.

The larger study of which AST and ABT were a part (Stennett, Smythe, Hardy, Wilson, & Thurlow, 1971), involved 16 tests. Brief descriptions of 5 of these tests which are pertinent to this study, follow.

Reading achievement. At a point near the end of the school year the teachers of the children involved in the study supplied a grade equivalent, oral reading score for each S. If a grade 2 child, for example, were rated by his teacher in June as having reading skill typical of that usually developed by most grade 2 students in January, that child would be assigned a grade equivalent score of 2-5, i.e., grade 2, fifth month. Such ratings, therefore, represent the teacher's assessment of achievement levels in 'absolute' terms.

Phoneme span. Ss were presented with sets of phoneme strings which varied in length from 2 to 5 phonemes, and were required to reproduce each sound string in the order in which it was given. The strings were composed of heterogeneous sets of long vowels, short vowels, and consonants given at 1 sec. intervals. The particular index of memory for speech sounds reported here was the total number of speech sounds each child was able to recall, regardless of order.

Word recognition and decoding. A series of 225 letter combinations, 75 each of lengths 2, 3, and 4 letters were presented visually to each child. One-fifth of all the items were real words which occur with high frequency in children's readers (Stennett, Smythe, Hardy, & Wilson, 1971) while the other 180 items were nonsense syllables. Upon presentation of each item S was required to judge whether it was a real word. Items were presented at the rate of 1 every 3 sec. A S's recognition score was the number of real words he identified correctly. After completion of the word recognition phase, S was shown the items he had indicated were real words and was asked to decode them. His decoding score was the number of real words he decoded.

Visual segmentation. This 60-item test was composed of 30 5-letter, and 30 7-letter combinations. Each 5-letter combination contained a digraph (i.e., 2 adjacent letters) which appears with high frequency in the English language, while the 7-letter items each contained 1 high-frequency trigraph. The remaining letters in each item were selected so that all other combinations, save for the target digraph or trigraph, were of very low frequency of occurrence (Underwood and Schulz, 1960).

Each item was presented by means of a carousel projector and children were asked to identify the two (or three) letters 'that are sometimes part of real words'. Separate recognition scores were recorded for both digraphs and trigraphs appearing in the initial, medial, and final positions.

TABLE 1
MEAN PERCENT CORRECT SCORES FOR AUDITORY SEGMENTATION AS A FUNCTION OF TYPE OF UNIT
AND GRADE

Sentences to Words	Words to Syllables		Words to Phonemes	
	% Correct		% Correct	
	Grade		Grade	
	1	2	1	2
Item	1	2	Item	2
Come and help.	100	100	going	each
See the house.	98	93	before	oak
It is morning.	98	96	able	ice
			over	bow
			never	if
We can play school.	98	98		
I saw a goat.	96	91		
See the boat go.	95	91		
			potato	meet
			beautiful	hit
Look at the big fish.	93	82	afternoon	deep
They went to the house.	93	89	beginning	heel
I am going to run.	90	93	another	used
I can play in the snow.	94	96	Elizabeth	yells
We have to go to school.	90	89	helicopter	rocks
The red ball is the biggest.	95	89	supermarket	bombs
			alligator	steps
			television	likes
How far is it to the lake?	86	82		
	84	70		

TABLE 1 (contd.)

Phonemes to Words									
2-Phoneme			3-Phoneme			4-Phoneme			
Item	% Correct		Item	% Correct		Item	% Correct		
	Grade			Grade			Grade		
	1	2		1	2		1	2	3
s-ee	64.2	84.4	b-ur-n	38.3	64.4	r-ou-n-d	22.2	48.9	
b-oy	64.2	88.9	thr-oa-t	35.8	64.4	pl-a-n-t	19.8	42.2	
sh-e	60.5	91.1	tw-i-n	34.6	53.3	h-o-l-d	14.8	51.1	
tr-y	59.3	86.7	r-u-n	30.9	26.7	m-o-n-ey	13.6	35.6	
sn-ow	58.0	82.2	fl-ow-er	29.6	51.1	ch-a-n-ge	12.3	42.2	
n-o	48.1	64.4	ch-ee-se	27.2	55.6	s-u-mm-er	12.3	31.1	
sm-all	48.1	77.8	sh-i-p	25.9	44.4				
ch-ew	46.9	77.8	cr-aw-l	22.2	37.8				
u-p	42.0	62.2	b-oi-l	21.0	55.6				
th-ey	38.3	60.0	t-ai-l	17.3	35.6				
f-or	28.4	51.1	ch-oi-ce	17.3	40.0				
spr-ay	18.5	24.4	wh-ir-l	13.6	33.3				
th-aw	14.8	35.6							

Phoneme-grapheme recognition. Thirty-three sets of 5 graphemes were shown separately to *S* by means of carousel projector. After each set was presented *S* heard a tape-recorded phoneme and pointed to the grapheme associated with that phoneme. The position of the correct response was randomly assigned among the 5 available positions. In order to minimize the visual discrimination requirements of the test, graphemes representing incorrect responses were selected so that they were as visually dissimilar to the correct grapheme as possible. *S*'s score was the number of correct phoneme-grapheme associations made in 3 trials.

Test Administration

In AST, *S* was first asked to repeat each of the items after the examiner. Then *E* demonstrated and gave *S* practice in segmenting the items or 'saying them in parts', i.e., repeating each unit, leaving a pause between each, e.g., 'John likes candy.'—'John . . . likes . . . candy.' The test items were presented individually by tape recorder and *S* was asked to say them in parts.

ABT required *S* to synthesize into words the word parts which he heard at $\frac{1}{4}$ sec. intervals. *E* demonstrated and gave practice in 'putting the parts together to make a word' and then presented the tape-recorded test items, e.g., 'but . . . ter'.

AST and ABT, parts of a battery of 16 tests, were given in randomized sequence on different days to control for possible transfer effects.

Data Handling and Statistical Analysis

Analysis included a simple tabulation of error patterns and trends and the following statistical computations: (1) calculation of a percentage correct score separately for each grade, level (length of utterance), and type of unit (word, syllable, phoneme), for each task (auditory segmentation and auditory blending), (2) an intercorrelation matrix of auditory segmentation and auditory blending scores and other reading subskill measures available from the larger study, (3) a number of analyses of variance with percentage correct scores as dependent variables. In order to obtain equal numbers of observations in each cell for the analysis of variance, 45 of the 81 grade 1 *Ss* were selected randomly to equal the number in the grade 2 sample.

Results

The percentages of items correct on both AST and ABT for all 126 *Ss*, calculated by grade, may be found in Tables 1 and 2.

An analysis of errors for a random sample of twenty *Ss* in AST revealed a number of trends in error types in WS1 and WP subtests. So few errors occurred in SW that no analysis was attempted. Although more detailed analysis is necessary, the following trends were noted: in WSi, *Ss* showed a tendency, with words of more than two syllables, to segment the first syllable only, e.g., a-nother; syllables made up of single vowel sounds, occurring in the medial position in words, appeared difficult to segment, e.g., E-liza-beth. Four-syllable, compound words were segmented as compound words, e.g., super-market. In WP, a definite trend toward seg-

TABLE 2

MEAN PERCENT CORRECT SCORES FOR AUDITORY BLENDING AS A FUNCTION OF TYPE OF UNIT AND GRADE

Syllables to Words										
2-Syllable			3-Syllable			4-Syllable				
Item	% Correct		% Correct		Item	% Correct		% Correct		Grade
	Grade		Grade			Grade		Grade		
	1	2	1	2		1	2	1	2	
but-ter	98.8	95.6	85.2	95.6	man-u-fac-ture	54.3	73.3			
doc-tor	93.8	97.8	75.3	93.3	e-mer-gen-cy	28.4	64.4			
num-ber	92.6	97.8	71.6	86.7	ter-ri-tor-y	28.4	48.9			
sav-ing	92.6	95.6	71.6	93.3	ed-u-ca-tion	25.9	55.6			
for-est	65.4	80.0	45.7	77.8	dif-fi-cul-ty	25.9	46.7			

menting the first phoneme and than repeating the whole word was noted, e.g., o-oak. Other common errors were: including the medial vowel with the initial consonant in 3-phoneme words, e.g., mee-t; segmenting only the first phoneme, e.g., b-ombs; dividing 4-phoneme words into 2 parts, e.g., ste-ps; segmenting whole words and word endings in 4-phoneme words, e.g., rock-s.

In ABT an analysis was made of item difficulty in relation to the phonemic composition of the items. Errors were tallied by type and comparisons made between easier and harder halves of each subtest. Although it is difficult to draw conclusions because of the small number of items of each of the various phonemic structures, some trends were noted. In SiW, consonant-consonant blends appeared to be easiest, followed by consonant-vowel combinations, with vowel-consonant breaks presenting most blending difficulty. An error-tally for PW suggested that of the seven elements included (single consonants, consonant blends, consonant digraphs, single vowels, controlled vowel, vowel blends, vowel digraphs), vowel digraphs and controlled vowels may be somewhat more difficult to blend than the other types of components. Verification of this finding, with a larger number of items, is needed.

Correlational Analysis

Table 3 presents the intercorrelations among auditory segmentation, auditory blending, and 7 other variables included in the larger study.

Though not included in Table 3, sex and chronological age yielded non-significant *rs* with all other variables. An examination of the relationships between the 2 AB subtests and among the 3 AS subtests suggests that success in blending and segmentation varies somewhat according to the type of unit involved, with blending success less dependent upon type of unit than segmentation success.

TABLE 3
INTERCORRELATION MATRIX FOR AUDITORY SEGMENTATION,
AUDITORY BLENDING AND 7 OTHER VARIABLES

Variables*	2	3	4	5	6	7	8	9	10	11	12
1. Reading Achievement	46	61	62	15	36	26	63	78	60	58	65
2. Phoneme Span		53	44	12	20	17	41	47	36	42	43
3. Auditory Blending: SiW			67	17	32	38	52	65	42	40	64
4. Auditory Blending: PW				19	34	50	40	60	42	41	62
5. Auditory Segmentation: SW					24	22	09	14	01	02	07
6. Auditory Segmentation: WSi						35	24	35	25	29	33
7. Auditory Segmentation: WP							15	33	16	16	43
8. Recognition								78	52	42	54
9. Decoding									58	47	75
10. Visual Segmentation: Digraphs										66	40
11. Visual Segmentation: Trigraphs											31
12. Phoneme-Grapheme Recognition											

* With N = 126 a correlation of .175 is required for significance at $p < .05$; .229 for $p < .01$.

The size of the correlations between blending SiW and segmenting WSi, and between blending PW and segmenting WP indicates that skills in auditory blending and auditory segmentation are not highly related, i.e., success in either blending or segmentation does not necessarily imply success in the other skill. Examination of segmentation skill across sensory modalities (auditory segmentation and visual segmentation) revealed that ability to segment visual and auditory material into units is modality specific.

The higher *rs* between phoneme span and auditory blending than between phoneme span and auditory segmentation suggest that memory is a more critical factor in blending than in segmentation. Auditory segmentation and auditory blending were correlated with several reading-like tasks (Recognition, Decoding, and Phoneme-Grapheme Recognition) as well as with teacher estimate of Reading Achievement (oral reading skill). Each of the reading-like tasks was significantly related to every other one and to Reading Achievement. In each case blending was more highly related to the reading-like tasks and to Reading Achievement than was segmentation.

The size of *rs* for segmenting SW probably reflects the reduced variability in this subtest because of high scores.

Analyses of Variance

Three-way analyses of variance, using percent correct scores, were performed separately for AS and AB. The following factors and levels were employed: *Grade* (2), *Length of Sequence* (3), and *Type of Unit* (3 levels

TABLE 4

MEAN PERCENT CORRECT RESPONSES FOR AUDITORY SEGMENTATION AS A FUNCTION OF GRADE, LENGTH OF SEQUENCE, AND TYPE OF UNIT (N = 45 PER CELL)

Type	Grade One		Grade Two	
	M	SD	M	SD
Sentence to Words				
3 and 4 words	98.00	11.79	98.20	6.92
5 words	94.91	16.70	96.58	9.73
6 and 7 words	95.20	16.21	96.18	8.44
Words to Syllables				
3 syllables	80.11	11.18	82.11	10.49
4 syllables	54.69	19.16	63.07	16.07
5 syllables	46.44	22.90	54.33	23.23
Words to Phonemes				
3 phonemes	57.44	34.14	71.67	33.44
4 phonemes	29.42	21.79	30.36	25.75
5 phonemes	19.67	17.66	22.11	20.99

TABLE 5

SUMMARY OF ANALYSIS OF VARIANCE OF AUDITORY SEGMENTATION
PERCENT CORRECT SCORES AS A FUNCTION OF GRADE, LENGTH OF
SEQUENCE, AND TYPE OF UNIT

Source	df	MS	F
Between S's	89		
A (Grade)	1	3,746.38	2.99
S's W	88	1,253.42	
W S's	720		
B (Length of Sequence)	2	48,586.34	267.43***
A x B	2	69.85	0.38
B x S's	176	181.68	
C (Type of Unit)	2	229,045.66	393.10***
A x C	2	570.02	0.98
C x S's	176	582.67	
B x C	4	11,040.51	61.92***
A x B x C	4	708.36	3.97**
B x C x S's	352	178.29	
Total	809		

** $p < .01$

*** $p < .001$

for segmentation and 2 levels for blending). The latter two factors involved repeated measures. In order to maintain three levels of the length factor for each task (segmentation and blending), the data for segmentation: SW were combined to create 3 lengths, i.e., 3- and 4-word sentences, 5-word sentences, and 6- and 7-word sentences.

Table 4 presents the means of percent correct responses and Table 5 the summary of analysis of variance of auditory segmentation percent correct scores as a function of *Grade*, *Length* of Sequence, and *Type* of Unit. Examination of Table 5 reveals no simple main effect of *Grade* but significant effects of *Length* of Sequence and *Type* of Unit, indicating that performance in segmentation drops as a function of increasing length of item and that SW is the easiest task for both grades, followed by WSi and WP. Two of the higher-level interactions were significant. The *Length* x *Type* interaction indicates that decrement in performance as a function of length is less pronounced in SW than in WSi or WP for both grades. However, inspection of the 3-way interaction of *Grade* x *Length* x *Type* reveals that the decrement for grade 2 in segmentation of WP is more pronounced than for grade 1.

Table 6 presents the means of percent correct responses and Table 7 the summary of analysis of variance of auditory blending percent correct scores as a function of *Grade*, *Length* of Sequence, and *Type* of Unit. The analysis of variance disclosed 3 simple main effects (*Grade*, *Length* and *Type*). Performance of the grade 2 sample was better than that of grade 1; longer items were more difficult than shorter ones; and it was

TABLE 6

MEAN PERCENT CORRECT RESPONSES FOR AUDITORY BLENDING AS A
FUNCTION OF GRADE, LENGTH OF SEQUENCE, AND TYPE OF UNIT
(N = 45 PER CELL)

Task	Grade One		Grade Two	
	M	SD	M	SD
Syllables to Words				
2 syllables	88.11	21.36	94.33	17.55
3 syllables	69.44	29.44	90.33	17.51
4 syllables	35.67	32.57	58.78	33.31
Phonemes to Words				
2 phonemes	43.98	29.23	69.29	21.90
3 phonemes	23.78	21.79	48.47	23.95
4 phonemes	16.56	23.12	42.49	31.73

TABLE 7

SUMMARY OF ANALYSIS OF VARIANCE OF AUDITORY BLENDING
PERCENT CORRECT SCORES AS A FUNCTION OF GRADE, LENGTH OF
SEQUENCE, AND TYPE OF UNIT

Source	df	MS	F
Between S's	89		
A (Grade)	1	59,682.09	27.20***
S's W	88	2,193.85	
W S's	450		
B (Length of Sequence)	2	57,095.47	155.63***
A x B	2	967.32	2.64
B x S's	176	366.87	
C (Type of Unit)	1	138,400.04	258.05***
A x C	1	2,478.98	4.62*
C x S's	88	536.34	
B x C	2	7,867.03	28.88***
A x B x C	2	936.21	3.44*
B x C x S's	176	272.39	
Total	539		

* p < .05
** p < .01
*** p < .001

easier to blend SiW than PW. Three of the 4 higher-level interactions were significant; *Grade x Type*, *Length x Type*, and *Grade x Length x*

Type. These findings can be interpreted as follows: the difference in performance between grade 1 and grade 2 is more pronounced in the case of PW (25.31%) than in SiW (16.71%); the decrement in performance as a function of length in the case of blending SiW is more pronounced. Between 3- and 4-unit items; the effect of increasing the number of units to be blended was more severe in grade 1 than grade 2 in SiW.

Discussion

Error analyses, for both AST and ABT, while indicating definite trends, do not allow extensive interpretation due to limitations in the data. In AST a more rigorous error analysis of a larger sample is required, while in ABT an analysis of errors reflecting phonemic components and item structure should be carried out, using a larger number of items of each type.

Although the findings of the study suggest that the skills of auditory segmentation and auditory blending are not highly related, the fact that the items of AST and ABT were not identical requires that this inference be regarded as tentative.

It is possible to rationalize the major findings of this study in terms of three factors, i.e., memory, familiarity with spoken language, and learning or instruction. The order of difficulty of the items varied as a function of the type of unit involved in both segmentation and blending, i.e., performance in both tasks decreased as the type of unit decreased in size and hence in inherent meaning (from words to syllables to phonemes in AST, and from syllables to phonemes in ABT). However, length of sequence had a more pronounced effect than type of unit and this effect was more apparent in ABT than in AST. In ABT : SiW length of sequence became important for success with items of more than three parts, but no similar effect was found in AST. The effect of increasing the length of sequence to be blended was more dramatic in grade 1 than grade 2. These findings implicate memory as a more important factor in blending than in segmentation. In AST Ss are required to hold in memory and to segment familiar, meaningful units (sentences or words), while in ABT relatively meaningless units (syllables or phonemes) must be held in memory and then synthesized to produce meaningful wholes. The memory requirements of segmentation and blending have differential effects upon success in the two tasks. In segmentation, Ss are able to segment as much of the utterance as they can remember, but in blending it is impossible to produce a meaningful response (word) unless the entire segmented utterance can be held in memory and then synthesized. The difference in skill in blending between grades 1 and 2 reflects, in part, the effects of instruction and experience with words and word parts to which grade 2 Ss are exposed. In blending SiW it appears that memory becomes an important factor in success after the sequences exceed three in number, i.e., even though Ss might be able to blend sequences of more than three syllables, memory limitations prevent this. Memory played a more important part with phonemes than with syllables, i.e., increasing the length of phoneme sequences was more critical than increasing the length of syllable sequences.

The greater familiarity of the syllable, as a unit, as compared to the phoneme, as a unit, probably accounts for this finding.

Examination of segmentation and blending in relation to oral reading achievement and success in other reading skills, as well as to instructional practices in beginning reading, reveals that blending is more strongly related to these factors than segmentation. The nature of the tasks involved in blending are probably more closely related to the reading task than are those in segmentation. Instructional practices in beginning reading tend to emphasize auditory synthesis into wholes rather than segmentation into parts. It may be that segmentation is more related to the task of spelling than to reading. In ABT grade 2 Ss showed significantly superior performance over grade 1 Ss in blending PW, which reflects the effect of instruction, i.e., in grade 2 students are not only taught a larger number of phonemes than grade 1 students, but these phonemes are given more emphasis and are applied in the task of word analysis.

Ability in auditory segmentation varied more with the type of unit involved than did auditory blending, i.e., in segmentation it seemed to make more difference whether the unit to be segmented was a sentence, syllable or word, than it did in blending whether the unit to be blended was a syllable or phoneme. This finding reflects the relative importance of familiarity with the spoken language in segmentation, as compared to blending. In segmentation (with SW and WS1 in particular), the natural intonation and rhythm of the language assist in the task, while in blending (in which relatively unfamiliar word parts have to be synthesized), natural, learned language patterns cannot be called upon as an aid.

The results of this study suggest that, for primary level children, the "natural" perceptual unit of spoken language is the syllable, not the phoneme. Because of the natural intonation and rhythm of the language, awareness of the syllable is readily established, but phonemes, as language units, must be learned. Since word analysis requires manipulation of phonemes, success in beginning reading depends upon the extent to which the child is able to develop a distinct auditory image or concept of each of the speech sounds. Blending, which appears to be a higher-level, more complex skill than segmentation, is also more highly related to reading achievement than segmentation. More information is needed to document the developmental patterns of both segmentation and blending.

* This study was supported in part under Canada Council grant number S70-0723. The authors wish to acknowledge the assistance of Mr. W. W. Shannon, Principal of Lorne Avenue Public School, and his staff during the course of this study.

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Some Correlates of Political and Religious Beliefs in Student-Teachers

The scores of almost one thousand student-teachers and post-graduate students in the Faculty of Education at Edmonton on thirty key variables of personality, values, educational and social attitudes are analyzed. Significant associations are found between these variables and religious and political affiliations, sex and type of course (undergraduate, after-degree or post-graduate). Factor analysis of the thirty variables reveals a student typology consisting of eleven bipolar categories.

Before beginning their courses in the Faculty of Education, it was planned that all entrants at The University of Alberta should be administered the *Survey of Educational Opinions*. Arrangements were made for these students to be tested in groups over a period of two days. On completion, it was discovered that only forty percent of the graduate student-teachers (Professional Diploma after Degree) had been captured by the sampling method used, and sixty-seven percent of the Bachelor of Education (freshman) group.

TABLE 1
THE SAMPLE TESTED

Description	B.Ed. (freshmen)	P.D.A.D.	Totals
Enrolment	840	421	1,261
Tested on Intake	562	177	739
Percentage Tested	67.26%	42.04%	58.58%

This result was extremely disappointing, especially as the nature of the biasses in the sample must remain unknown. In the circumstances the original intention of relating this pre-test to performance in courses, and to

a post-test which would reveal changes associated with these courses, was abandoned. However, it was decided to salvage the data as certain relationships could still be made out. The fact that we had succeeded in collecting information from more than 700 students, in the form of measurements on 30 variables, using standard instruments, was in itself an achievement justifying the investment of time and money. Although the sample is biased in unknown ways, it is also a fact that certain comparisons are less affected than others. For example, factor analyses should be minimally affected, likewise religious and political comparisons. It is when comparisons are made with non-Canadian groups that the sampling bias is, presumably, operative at a maximal level.

The detailed breakdown of the sample is shown in Table 2. In various comparisons, a third group of Edmonton students, consisting of complete course groups in two graduate programs, will be shown for interest as giving some indications of the possible effects of the initial training on the various kinds of student represented in the sample.

I. General Orientation to Education

There are measures available on six variables which throw light on the general attitude of students to the role, function, activities and profes-

TABLE 2
COMPOSITION OF THE SAMPLE

	B.Ed.	P.D.A.D.	Total
n =	562	177	739
Men	144	59	203
Women	418	118	536
17-25 years	536	147	683
26-35 years	26	30	56
1. Catholics*	139	31	170
2. Orthodox	32	6	38
3. Anglican	34	9	43
4. Protestant	143	42	185
5. Small Sects	117	26	143
6. Far Eastern	6	5	11
7. Atheists	91	58	149
1. Conservatives	89	27	116
2. Liberals	199	62	261
3. Socialists	73	21	94
4. Independent and None	201	67	268

* Includes all those groups which follow the Western (Roman) rite, such as Ukrainian Catholics.

sional satisfactions of the teacher. These are: Formalism, Punitiveness, Emotional Satisfaction derived from Contacts with Children, Attitude to Personal Development, Attitude to Professional Development as a Teacher, Job Satisfaction expected from Teaching as a Career.

Formalism is here defined as the tendency to insist on standards of workmanship and behavior in a teacher-centred classroom with defined formal activities, orderly behavior, homework, and punishment for wrongdoing. This is in contrast to a more permissive, activity-oriented, child-centred and non-punitive attitude. As in other groups tested, the scores on this variable are associated with differences in academic standing, age, religion and political affiliation.

Apart from the course, sex and age differences, the only other differences (shown by an asterisk) which are statistically significant, are as follows: atheists and agnostics are much more permissive than any of the religious groups. Conservatives have a very high score in formalism. There is a difference between B.Ed. freshmen and P.D.A.D. students of all

TABLE 3
FORMALISM

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	11.94	10.93	8.99
Women	12.22	9.14	8.95
17-25 years	12.18	10.10	9.24
26-35 years	11.58	7.97	8.52
1. Catholics	13.26	11.06	10.02
2. Orthodox	12.16	12.33	9.80
3. Anglicans	12.56	9.78	7.77
4. Protestants	12.38	10.83	10.07
5. Small Sects	12.83	9.77	9.34
6. Far Eastern	9.67	9.40	11.00
7. Atheists	9.22*	7.98*	7.10*
1. Conservatives	13.37*	12.00*	11.37*
2. Liberals	12.07	9.53	8.93
3. Socialists	11.33	8.95	8.17
4. Independent and None	11.98	9.27	8.36
Average	12.15*	9.74*	8.97*
Index numbers	100	81	75

* An asterisk here, and in later tables, indicates that the group average differs significantly from that of the other groups. It should be noted that the test of significance takes account not only of differences in two averages but also the numbers of cases in each group.

varieties, the former being more strongly in favor of formal methods. Taking the freshmen as having an index of 100, P.D.A.D. students average 81, graduate students 75.

Punitiveness is defined as an attitude favorable to a retributive theory based on the notion that human nature is corrupt and requires to be chastened by physical punishment which acts to keep a check on evil impulses. This is usually associated with a favorable attitude to formal methods of teaching. It is not surprising that somewhat similar trends are indicated although the differences are not so extreme and often do not approach statistical significance. But women appear to be less punitive and less formalist than men; older students are less punitive and less formalist than younger ones; atheists and agnostics are less punitive and less formalist than any religious group, Far Eastern religions excepted. These differences reach significance only in the B.Ed. group. Conservatives are definitely more punitive and formalist than other political groups. The P.D.A.D. group appears to be slightly less punitive than the freshmen group, but again the difference is not statistically significant.

Emotional satisfaction associated with contacts with children measures

TABLE 4
PUNITIVENESS

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	4.23*	4.02	9.34*
Women	3.94*	3.72	7.75*
17-25 years	4.02*	3.88	7.38*
26-35 years	3.81*	3.50	10.28*
1. Catholics	3.99	3.45	7.43
2. Orthodox	3.78	4.50	7.80
3. Anglicans	4.50	3.33	7.69
4. Protestants	3.92	4.07	7.77
5. Small Sects	4.50	4.46	8.79
6. Far Eastern	2.83	3.40	13.50
7. Atheists	3.53*	3.59	9.86
1. Conservatives	4.57*	4.59*	8.27
2. Liberals	4.01	4.00	9.02
3. Socialists	3.52	3.76	9.05
4. Independent and None	3.94	3.36	7.58
Average	4.01	3.81	8.48
Index numbers	100	95	not comparable

TABLE 5
EMOTIONAL SATISFACTION FROM CHILDREN

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	12.49*	12.81*	9.15*
Women	14.41*	14.36*	10.92*
17-25 years	13.97*	13.68*	11.19*
26-35 years	12.92*	14.63*	8.36*
1. Catholics	13.83	13.42	10.61
2. Orthodox	14.38	13.33	11.00
3. Anglicans	13.91	14.00	10.15
4. Protestants	14.17	13.98	10.72
5. Small Sects	13.74	14.15	10.41
6. Far Eastern	13.33	15.20	6.50
7. Atheists	13.77	13.74	9.05
1. Conservatives	13.70	12.96	10.20
2. Liberals	13.97	13.84	9.52
3. Socialists	14.10	15.05*	9.91
4. Independent and None	13.90	13.82	10.93
Average	13.92	13.84	10.11
Index numbers	100	99	73

rather an immature and non-professional attitude of “mothering” children in a caring, rather than a didactic or pedagogical relationship. It is correlated negatively with punitiveness. The differences here lie between the men and women in the sample, and curiously enough, between P.D.A.D. Socialists (who score highest) and P.D.A.D. Conservatives (who score lowest) on this variable. There is a reversal in the case of age, younger B.Ed. students scoring higher than older B.Ed. students, as expected, but older P.D.A.D. students scoring higher than younger. The greatest difference is between the experienced teachers in the graduate program and the two groups of relatively unsophisticated student-teachers. As found in earlier studies, there is a decline in score, associated with actual teaching experience, in this variable.

Attitude to *Personal Development* is a measure of the degree to which the subject places high regard on activities associated with study, such as reading for general improvement, studying for higher academic qualifications and attending lectures by experts.

The major difference here lies between the graduate students and the two student-teacher groups. The sharp decline in the favorable attitude

TABLE 6
ATTITUDE TO PERSONAL DEVELOPMENT

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	14.83	15.17	11.05*
Women	14.60	15.14	12.47*
17-25 years	14.61*	15.17	12.61*
26-35 years	15.73*	15.07	10.54*
1. Catholics	14.63	15.03	12.65
2. Orthodox	15.34	15.50	12.80
3. Anglicans	14.12	15.44	12.15
4. Protestants	14.63	15.83	12.21
5. Small Sects	14.49	14.65	11.44
6. Far Eastern	14.67	15.00	9.00
7. Atheists	14.95	14.88	10.94
1. Conservatives	14.40	15.52	11.93
2. Liberals	14.80	15.26	11.44
3. Socialists	15.18*	15.24	12.17
4. Independent and None	14.45	14.88	12.07
Average	14.66*	15.15*	11.82*
Index numbers	100	103	78

to personal development is probably associated with the career orientation of this group and their probable surfeit of lectures by experts, reading and other activities which have become relatively disfavored because of the compulsions and constraints associated with course work.

Attitude to *Professional Development* is similar to the previous variable. It measures a favorable attitude to the trying-out by the respondent of new teaching methods, attending courses related to professional development as a teacher, and classroom evaluation of students' work. The differences here are between the men and women in the B.Ed. sample, between the religious groups in the same sample, and between the graduate students and both groups of student-teachers. It appears that women freshmen are more favorably oriented towards their own development as teachers. There are also differences which appear between Orthodox Christians, Atheists, and members of small Protestant Sects; the former are more interested, the latter are least interested in their development as teachers. But the actual differences are very small. The graduate students are relatively unfavorable to teaching as a career—this is probably to be explained in the same way as their expressed relative de-emphasis on their personal

development. Surfeit breeds cynicism! There is also a selective factor operating in that satisfied teachers are to be found in classrooms: relatively dissatisfied ones in graduate school.

TABLE 7
ATTITUDE TO PROFESSIONAL DEVELOPMENT

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	17.76*	17.73	12.19*
Women	18.26*	17.97	13.80*
17-25 years	18.11	17.77	14.39*
26-35 years	18.54	18.50	10.89*
1. Catholics	18.14	18.35	14.00
2. Orthodox	18.88	19.50	13.80
3. Anglicans	17.85	18.67	13.15
4. Protestants	18.18	18.64	13.82
5. Small Sects	18.15	16.73	13.21
6. Far Eastern	17.00	17.60	10.50
7. Atheists	17.93	17.36	11.57
1. Conservatives	18.34	17.48	13.20
2. Liberals	18.08	18.21	12.45
3. Socialists	18.58	18.14	12.60
4. Independent and None	17.94	17.69	14.01
Average	18.13	17.89	13.06*
Index numbers	100	99	72

This is true also of the last variable in this group—*Job Satisfaction*. This is a measure of commitment to the task indicated by the prediction of the degree of satisfaction, or interest, associated with defined activities forming part of the job analysis. Here only the differences between men and women are significant, but the actual difference is of the order of one point in nine.

In summary: it may be concluded that with respect to the career of teaching, the attitudes of the various groups tested show little difference in relation to the work involved; differences appear as between religious and political groups in relation to the nature of the teacher's role and function. These differences centre around the core attitudes, towards formal or permissive procedures and towards deserved punishment for wrongdoing.

TABLE 8
JOB SATISFACTION

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	8.26*	8.66*	8.46*
Women	9.29*	9.74*	9.45*
17-25 years	9.01	9.22	9.21
26-35 years	9.38	10.17	8.65
1. Catholics	9.04	9.19	8.88
2. Orthodox	10.13	9.83	7.20
3. Anglicans	8.50	10.00	10.00
4. Protestants	8.99	10.31	9.40
5. Small Sects	8.80	8.58	9.28
6. Far Eastern	7.67	9.40	10.00
7. Atheists	9.26	9.02	8.49
1. Conservatives	8.88	8.52	9.53
2. Liberals	9.09	9.55	8.95
3. Socialists	9.78	10.19	9.77
4. Independent and None	8.77	9.31	8.40
Average	9.03	9.38	8.99
Index numbers	100	104	99

II. Personality Characteristics

Three variables throw light on personality differences between the various groupings—*anxiety*, *neuroticism* and *extraversion*. On intake, these differences are quite small. It would be of considerable interest to discover whether the various programs taken by students operate to increase differences, or whether the Faculty of Education exercises no specific influence on these variables.

Anxiety is measured by means of a word association test based on the principle of presenting the respondent with a choice of associations, selected as discriminating between normal and neurotic (anxious) populations. The only significant differences which appear are between men and women in the B.Ed. program, between Atheists, Protestants and members of small Protestant Sects in the B.Ed. program and between the P.D.A.D. group, the B.Ed. freshmen and the graduate students in the education program.

TABLE 9
ANXIETY LEVEL

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	9.76*	7.32	8.91*
Women	8.83*	6.81	7.47*
17-25 years	9.15	6.94	8.62
26-35 years	7.50	7.17	7.35
1. Catholics	9.74	7.52	7.76
2. Orthodox	10.28	7.67	10.60
3. Anglicans	8.00	6.56	9.00
4. Protestants	8.25*	6.02	7.30
5. Small Sects	8.08*	6.65	8.10
6. Far Eastern	10.17	5.60	14.50
7. Atheists	10.51*	7.64	8.62
1. Conservatives	9.73	7.07	6.87*
2. Liberals	8.77	6.69	7.97
3. Socialists	8.93	7.67	9.17*
4. Independent and None	9.12	6.99	7.83
Average	9.07*	6.98*	8.13
Index numbers	100	77	90

It should be recalled at this point that both P.D.A.D. and the graduate student groups were allowed to complete the questionnaire at home. This may account for part of the extremely high level of anxiety in the B.Ed. group, although it tells us nothing about the graduate students' anxiety level which is also very high relative to groups of other nationalities.

Neuroticism is measured in terms of the degree to which the subject accepts a number of statements about himself (herself) which are also accepted by individuals who are mentally disturbed. There are few differences of significance in this variable. Younger students score higher in neuroticism in both P.D.A.D. groups, significantly so in the B.Ed. group. The B.Ed. students as a whole also score higher than the P.D.A.D. group, this may be a function of the fact that they are younger, on the average. Confirming expectations based on testing other groups, the female students score higher than male students in both the B.Ed. and P.D.A.D. student-teacher groups. Again, probably by virtue of the age differential, graduate students score at the same level as the P.D.A.D. group in neuroticism.

TABLE 10
NEUROTICISM

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	7.01*	5.44*	6.09*
Women	7.68*	7.11*	7.19*
17-25 years	7.59*	6.63	7.08*
26-35 years	5.85*	6.20	6.05*
1. Catholics	7.37	6.48	7.24
2. Orthodox	8.69	6.67	4.80
3. Anglicans	7.18	6.33	6.69
4. Protestants	7.25	6.07	6.74
5. Small Sects	7.62	6.65	6.31
6. Far Eastern	6.83	6.20	7.50
7. Atheists	7.71	6.95	6.51
1. Conservatives	7.48	6.74	6.20
2. Liberals	7.48	6.56	6.31
3. Socialists	7.18	6.52	6.57
4. Independent and None	7.66	6.48	7.45
Average	7.51*	6.55*	6.69*
Index numbers	100	87	89

Extraversion is a measure of the degree to which the respondent is oriented towards social relationships rather than towards solitary activities of an ego-centred character. It is one of only two of the thirty variables where no differences of any significance were found in the entire intake sample (Table 11).

In summary: apart from the extremely high anxiety level of the B.Ed. students (the highest ever recorded in any group), the intake shows a remarkable homogeneity in the areas of personality looked at—extraversion-introversion and stability-neuroticism. We were not surprised in this part of the study by the relatively higher score in neuroticism of the female students, it is a function of paper-and-pencil tests of neuroticism that women tend to score higher than men.

III. Personal Values

There are nine variables in this area, the score on each being derived from the choices made by the respondent of alternatives in a number of hypothetical situations such as buying a car, receiving a legacy, joining a

TABLE 11
EXTRAVERSION

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	13.76	12.54	13.75
Women	13.91	13.67	13.39
17-25 years	13.88	13.39	13.25
26-35 years	13.73	12.83	14.04
1. Catholics	13.87	13.45	13.06
2. Orthodox	14.69	17.00	14.60
3. Anglicans	13.03	12.11	12.31
4. Protestants	13.94	12.50	14.02
5. Small Sects	13.90	13.58	13.10
6. Far Eastern	13.00	12.40	15.00
7. Atheists	13.82	13.53	13.86
1. Conservatives	13.65	12.93	12.37
2. Liberals	14.05	13.40	14.40
3. Socialists	13.86	12.95	13.74
4. Independent and None	13.80	13.45	12.91
Average	13.87	13.29	13.56
Index numbers	100	96	98

club, entertaining friends, etc. etc. The choices are ranked so that the scores on the variables are not independent—a grand total of 72 points having to be awarded to each subject on the basis of the choices he (she) makes. Interest here is therefore concentrated on the *patterns* of values manifested by the choices, rather than in individual variables. It is a matter of alternatives, rather than of absolutes.

The nine values can be defined in general terms, as follows: *Freedom* is an attitude favourable to a desire to exercise independent judgment. *Helpfulness* refers to an attitude of caring for others in social, family and friendship activities. *Experience* is an attitude which favours having a variety of interesting contacts and new experiences for oneself. *Power* expresses an interest in exercising authority over others and in being associated with influential persons and organizations. *Recognition* is a value which measures the degree to which the respondent is concerned with acquiring prestige with friends and social approval in general. *Response* is a value which characterises the person who is interested in attracting people

and putting others at their ease. *Security* is a measure of the value placed on social and financial stability as the basis of individual comfort and enjoyment of a decent standard of living. *Submission* is a measure of the respondent's need for authoritative counselling by friends, teachers and experts generally. *Workmanship* measures the urge to perform adequately and to value skill and workmanlike qualities in others.

TABLE 12

FREEDOM

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	9.12*	8.76	9.52
Women	8.36*	8.78	9.05
17-25 years	8.59	8.78	9.13
26-35 years	7.81	8.80	9.48
1. Catholics	8.32	8.39	9.08
2. Orthodox	7.50	7.67	9.60
3. Anglicans	8.29	8.89	7.85
4. Protestants	8.09	7.71	8.53
5. Small Sects	8.37	8.50	9.62
6. Far Eastern	11.00	8.20	5.50
7. Atheists	10.16*	10.03*	10.30*
1. Conservatives	7.52*	7.30*	7.67
2. Liberals	8.60	8.87	9.36
3. Socialists	8.79	9.43	10.17
4. Independent and None	8.87	9.09	9.39
Average	8.55	8.78	9.27
Index numbers	100	103	109

The degree to which freedom is valued is an important discriminant. Men score significantly higher than women in the B.Ed. group; atheists score higher than other (religious) groups, except for those belonging to Far Eastern religions; Conservatives score much lower than other political groups in their expressed need for exercising independent judgment.

In the case of the B.Ed. students, the Conservatives also indicate a lower need for new experience: in contrast to their attitude to freedom and experience, they express a greater need for social and professional recognition. In the case of the P.D.A.D. Conservatives, they compensate for their lower evaluation of freedom of independent judgment by expressing a greater need for financial and social security. In the B.Ed. group, the

atheists compensate for their greater need for freedom by a lower score for the values of response and security. In the P.D.A.D. group they spread their choices in a more random fashion so that no differential pattern emerges.

TABLE 13

PERSONAL VALUE PATTERNS OF MEN AND WOMEN STUDENT-TEACHERS

Value	B.Ed. Students		P.D.A.D. Students		Graduate Students	
	M	W	M	W	M	W
n =	144	418	59	118	100	118
1. Freedom	9.12*	8.36*	8.76	8.78	9.52	9.05
2. Helpfulness	10.79*	11.33*	11.80	11.69	11.31	11.47
3. Experience	10.33*	10.77*	10.08*	11.38*	10.68	10.64
4. Power	4.68*	3.90*	5.36*	3.37*	4.66*	5.28*
5. Recognition	6.30*	5.75*	6.32	5.60	5.70	5.58
6. Response	6.00*	6.71*	6.15	6.42	6.05*	6.86*
7. Security	9.10	9.14	8.93	8.75	8.62	8.76
8. Submission	5.83*	6.40*	6.15	6.70	5.79*	6.36*
9. Workmanship	10.13	9.97	10.37*	9.58*	10.07	9.69

Men and women students in both groups show a different value-pattern. In the B.Ed. group men and women differ on seven of the values measured, in the P.D.A.D. group only on three. Women B.Ed. students are less interested in freedom, power and recognition than are men; they are more interested in helpfulness, new experience, response, and are more submissive than are the men B.Ed. students. In the P.D.A.D. group, women differ from men in being more interested in experience and less interested in power and workmanship. These differences between the value-patterns of B.Ed. and P.D.A.D. women versus men are probably due to the smaller numbers sampled in the latter group; in terms of the *direction* of differences on the nine variables the patterns as between men and women are the same.

In both student-teacher groups, the younger students are more interested in new experience; the older students are more interested in power and security.

In summary: there seems to be a considerable agreement about personal values within the two groups of student-teachers as well as between the two groups. The differences that do emerge are primarily related to the value of freedom which discriminates on the one hand between atheists and religious persons and between Conservatives and students of other political persuasions. Speaking relatively, and not in absolute terms, atheists overvalue freedom of independent judgment and new experience for themselves at the expense of their own social and financial security

TABLE 14
PERSONAL VALUE PATTERNS OF RELIGIOUS GROUPS

Value	Catho- lics	Ortho- dox	Angli- cans	Protes- tants	Small Sects	East- ern	Athe- ists	Av.
B.Ed. Students								
1. Freedom	8.32	7.50	8.29	8.09	8.37	11.00	10.16*	8.61
2. Helpfulness	11.17	11.81	11.09	11.33	11.17	10.83	10.87	11.32
3. Experience	10.50	10.81	9.97	10.76	10.54	10.17	11.11	10.71
4. Power	4.13	3.69	4.50	4.12	3.78	4.83	4.40	4.14
5. Recognition	6.17	6.66	5.70	5.88	5.76	5.83	5.46	5.88
6. Response	6.83	6.91	6.21	6.60	6.55	7.33	5.86*	6.48
7. Security	9.31	8.81	9.79	9.12	9.29	10.50	8.44*	9.06
8. Submission	6.06	5.50	6.53	6.36	6.54	7.17	6.10	6.32
9. Workmanship	9.91	10.28	10.41	9.90	10.31	10.00	9.70	9.97
P.D.A.D. Students								
1. Freedom	8.39	7.67	8.89	7.71	8.50	8.20	10.03*	8.61
2. Helpfulness	12.23	11.33	11.33	11.40	12.08	10.80	11.71	11.32
3. Experience	10.35	9.17	10.89	10.81	11.19	12.20	11.34	10.71
4. Power	3.84	5.67	3.67	4.33	3.81	4.40	4.48	4.14
5. Recognition	5.55	6.50	6.22	5.40	6.15	5.80	6.05	5.88
6. Response	6.74	6.00	7.11	6.12	6.54	5.40	6.16	6.48
7. Security	8.71	10.67	9.44	9.48	8.27	8.80	8.33	9.06
8. Submission	7.16	6.83	6.67	6.52	6.23	5.60	6.33	6.32
9. Workmanship	9.74	8.33	9.22	10.33	9.31	10.80	9.95	9.97

and social recognition. Conservatives undervalue freedom and new experience, giving their regard to recognition and security. It is probable that the differences between Conservatives and atheists are bound up more closely with their disparate social attitudes—in other words a large proportion of the atheists are also radicals and socialists.

IV. Social Attitudes

The two variables throwing light on social attitudes are conservatism-radicalism and tender vs. tough-mindedness. These have been shown to be the most basic measures in this area. *Radicalism* is defined as an attitude of antagonism to a great number of prevailing practices and opinions related to the preservation of social, class and institutional arrangements based on private ownership and a theory of social *élitisme*. Operationally it is defined in terms of the score on the inventory devised by Eysenck (as revised by the present author). *Tendermindedness* is defined in terms of the same instrument which gives a measure of the degree

TABLE 15
PERSONAL VALUE PATTERNS OF POLITICAL GROUPS

Value	Conservatives	Liberals	Socialists	Independents	Av.
<i>B.Ed. Students</i>					
1. Freedom	7.52*	8.60	8.79	8.87	8.61
2. Helpfulness	11.25	11.25	11.60	10.96	11.32
3. Experience	10.22	10.79	10.03*	10.94*	10.71
4. Power	4.11	3.90	4.29	4.23	4.14
5. Recognition	6.66*	5.71	5.75	5.79	5.88
6. Response	6.54	6.65	6.68	6.34	6.48
7. Security	9.55	9.14	9.32	8.87	9.06
8. Submission	6.26	6.30	6.16	6.23	6.32
9. Workmanship	10.20	9.90	10.10	10.01	9.97
<i>P.D.A.D.</i>					
1. Freedom	7.30*	8.87	9.43	9.09	8.61
2. Helpfulness	11.74	11.60	12.10	11.72	11.32
3. Experience	10.63	11.02	10.52	11.15	10.71
4. Power	4.52	3.94	4.33	4.36	4.14
5. Recognition	6.07	5.92	4.81	6.00	5.88
6. Response	6.30	6.42	6.29	6.27	6.48
7. Security	10.19*	8.58	8.48	8.57	9.06
8. Submission	6.41	6.58	6.43	6.54	6.32
9. Workmanship	9.11	9.69	9.76	10.30	9.97

to which the respondent is more concerned about individual (hard) cases, than about absolute standards of behavior and social legality. These two variables are the most discriminating of any in the battery of thirty. Most of the categories into which the students can be divided show significant differences in radicalism. Tendermindedness does not discriminate between the political groups, nor the age groups, but does with most others.

Liberals and Socialists are more radical than the other two groups in the P.D.A.D. sample; only the Socialists are more radical in the B.Ed. group, the others do not differ significantly. Atheists are more radical than the religious groups, the reason for this has already been stated as a hypothesis. Similar differences are found in tendermindedness (Table 17).

Here the differences lie between the group of Catholics and the others. Most of the differences can be explained in terms of the items which score for toughmindedness—sterilization of the “unfit”; absolute freedom of speech, press and stage; abortion on demand, easier divorce, “trial marriages” and birth control. Indeed, it is the amount of agreement as between the Catholics and the atheists which is surprising. The very low score of the Anglicans (lower than atheists in the B.Ed. group) is also surprising.

TABLE 16
RADICALISM

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	7.07	6.49*	7.92
Women	6.71	7.82*	8.01
17-25 years	6.79	7.14*	7.79
26-35 years	6.96	8.53*	8.25
1. Catholics	6.43	6.55	6.84
2. Orthodox	6.63	5.33	5.40
3. Anglicans	6.59	7.00	7.08
4. Protestants	6.71	7.24	8.32
5. Small Sects	6.35	7.00	7.48
6. Far Eastern	6.83	8.00	4.00
7. Atheists	8.24*	8.31*	9.27*
1. Conservatives	6.12	6.04	6.87*
2. Liberals	6.74	7.69*	7.97
3. Socialists	7.71*	8.00*	9.17*
4. Independent and None	6.84	7.43	7.84
Average	6.80*	7.38*	7.97*
Index numbers	100	109	117

IV. Educational Values

Closely related to the social attitude variables are the three measures of educational values devised by Oliver and Butcher—Naturalism-Idealism, Toughmindedness in Education and Radicalism in Education. In addition, five variables indicate the respondent's view of the proper function of the school—whether physical health and development, aesthetic development, scholastic activities, religious truth, or a utilitarian service to the community are most important. Like the personal values test, reported scores on the last five variables are interconnected, being based on the ranking of desirable alternatives by the respondent.

Naturalism in education is defined as an attitude which favors spontaneous development in children (Rousseauism), rather than a forced compliance with external or absolute standards (Platonic idealism). *Radicalism in education* is measured by the amount of change in the educational system the respondent is prepared to accept or advocate. *Toughmindedness in education* is a measure of the respondent's acceptance of a social utilitarian view of the curriculum.

TABLE 17
TENDERMINDEDNESS

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	5.73*	5.97	6.49
Women	6.45*	6.26	6.93
17-25 years	6.27	6.05	6.63
26-35 years	6.23	6.70	6.89
1. Catholics	7.07*	7.58*	7.80*
2. Orthodox	6.09	4.67	4.40*
3. Anglicans	5.29*	5.78	6.46
4. Protestants	6.16*	5.81	6.19
5. Small Sects	6.47	5.85	7.48
6. Far Eastern	5.17	6.40	7.50
7. Atheists	5.45*	6.00	6.25*
1. Conservatives	6.42	6.07	6.47
2. Liberals	6.29	6.15	6.84
3. Socialists	6.53	6.43	7.20
4. Independent and None	6.08	6.13	6.46
Average	6.27	6.16	6.73
Index numbers	100	98	107

The five educational values remaining are defined as follows: *Physical value* is characterized by an emphasis on the need for the school to make provision for physical exercise, games, fresh air, instruction in hygiene and health as a major priority.

Aesthetic value emphasizes creative achievement in art and drama, music, poetry, sculpture and on individual spontaneity in these areas. *Scholastic value* emphasizes intellectual matters. *Religious value* measures rather a fundamentalist attitude to "the true faith", moral tone, religious services, etc., in the life of the school. *Utilitarian value* emphasizes the school's part in producing "good citizens" and "practical" people. In the case of these five variables, a difficulty arises in that a different scoring system was used with the graduate students' responses. The *average* scores of this group have been adjusted to make the three groups comparable.

TABLE 18
NATURALISM IN EDUCATION

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	8.65	8.08*	10.13*
Women	8.87	9.75*	10.87*
17-25 years	8.85	8.97	10.37
26-35 years	8.08	10.27*	10.80
1. Catholics	8.59*	9.71	10.00
2. Orthodox	8.28	8.50	8.40
3. Anglicans	8.76	9.33	11.46
4. Protestants	8.89	8.52	10.39
5. Small Sects	8.35*	8.85	10.86
6. Far Eastern	9.66	8.40	9.50
7. Atheists	9.77*	9.67	10.94
1. Conservatives	8.09	8.33	9.63
2. Liberals	8.85	9.10	10.58
3. Socialists	9.21*	10.19	11.09
4. Independent and Others	8.96*	9.31	10.58
Average	8.81	9.19	10.52*
Index numbers	100	104	120

As far as naturalism in education is concerned, the differences are clear-cut and could have been predicted. Women are more naturalistic in their thinking than are the men student teachers. Graduate students are more naturalistic than the P.D.A.D. intake, and they more than the B.Ed. freshmen. The older students in the P.D.A.D. program are more naturalistic than the younger. Atheists are more naturalistic than Catholics. Socialists and Independents are more naturalistic than Conservatives.

In the case of Radicalism in Education, there are several strange anomalies, not readily to be understood. Conservatives seemingly are, on the average, more radical than the Socialists—indeed they are the people more than any other group, who desire most change in the educational system. Again, aside from the eleven students from the Far East, atheists are the most conservative of any of the religious groups, advocating least change in the educational system. Protestants and Catholics are relatively radical.

TABLE 19
RADICALISM IN EDUCATION

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	52.49	52.41*	64.25*
Women	51.55	49.33*	59.19*
17-25 years	51.83	51.10*	58.99*
26-35 years	51.00	46.70*	65.61*
1. Catholics	52.30	51.06	58.96
2. Orthodox	50.44	50.33	64.00
3. Anglicans	52.29	46.89*	59.92
4. Protestants	52.07	53.43*	59.33
5. Small Sects	52.62*	50.00	61.10
6. Far Eastern	49.17	42.60	79.50
7. Atheists	49.97*	49.12	65.21
1. Conservatives	53.99*	56.04*	60.07
2. Liberals	51.31	49.35	62.85
3. Socialists	50.93	46.33	64.26
4. Independent and Others	51.60	50.25	59.00
Average	51.79*	50.36*	61.51
Index numbers	100	97	119

Toughmindedness in education, which is in reality a measure of a utilitarian attitude to the curriculum, is relatively high in the B.Ed. group. Atheists and Socialists score low on this variable, Conservatives and Catholics score high (cf. Utilitarian value where these relationships are reversed).

In the variable Toughmindedness in Education, the group of atheists score significantly lower than do Catholics (and Protestants too in the P.D.A.D. group). B.Ed. students as a group are more inclined towards toughmindedness in education than either of the other two groups.

The only significant difference in the attitude to physical exercise and hygiene as a primary emphasis in the organization of the School lies between Conservatives in the B.Ed. group (who value it least) and those of no political allegiance (who value it most). Conservatives in both groups also place least value on the aesthetic function of the school. Women score higher than men in both groups in this variable. There are no differences between any of the categories of students in the variable schol-

TABLE 20
TOUGHMINDEDNESS IN EDUCATION

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	12.98	11.78	11.98
Women	13.61	12.29	12.50
17-25 years	13.50	12.25	12.62
26-35 years	12.42	11.47	11.67
1. Catholics	14.22*	13.61*	12.73
2. Orthodox	13.66	13.83*	14.60*
3. Anglicans	13.88	12.44	14.00
4. Protestants	13.48*	12.88	12.84
5. Small Sects	14.10*	12.31	12.14
6. Far Eastern	10.17	13.60	17.50
7. Atheists	11.36*	10.33*	10.71*
1. Conservatives	14.08	13.52	13.73
2. Liberals	13.36	11.60	12.35
3. Socialists	12.92	12.86	11.37
4. Independent and Others	13.45	11.81	11.96
Average	13.45*	12.12	12.26
Index numbers	100	90	91

astic value, except that graduate students score much lower than the other two groups. On the other hand, the differences are maximized in the case of religious value. B.Eds. score higher than P.D.A.D. students, and both much more than graduate students. Men score higher than women in the P.D.A.D. group. Atheists, Anglicans and Protestants score lowest in religious value in the B.Ed. group: in the P.D.A.D. the difference lies between Catholics and Atheists. Utilitarian value serves to distinguish only the Conservatives in the B.Ed. group from the other political groupings (they are slightly, but significantly more utilitarian) and men from women in the B.Ed. group. The P.D.A.D. group as a whole is more utilitarian in outlook than are the B.Eds. Thus the major contrasts in value patterns are in relation to *religious* and *aesthetic* values: groups tend to agree about the physical, scholastic and utilitarian functions of the School.

In summary: in terms of educational values the B.Ed. and the P.D.A.D. groups differ from each other in that the B.Ed. group desires slightly more change in the educational system, they take a more socially oriented and less individually oriented view of the curriculum, they place higher

regard on the religious function of the school and less on the utilitarian. This difference in attitude to the school as a total institution and towards the function of the different subjects in the curriculum of studies is very interesting, suggesting a liberalizing effect on attitude to subjects as a result of taking university courses. The B.Ed. students are more certain of their opinions over a whole range of topics and more dogmatic about those which they adhere to as individuals. These are the most interesting differences. The other major differences are between men and women in the two intake samples. Women are more certain of their views, they tend to be also more religious, more aesthetic and less utilitarian than men. Atheists seem to form a distinctive group, as do the Conservatives. Atheists tend to be more radical, less toughminded, more interested in the aesthetic and utilitarian functions of the school, and less in the religious. Conservatives are interested in major changes in the school (paradoxically), they value the physical side of the school's activities and function less than do others, they are significantly less interested in the creative and expressive arts in the school organization, they stress the religious function more.

TABLE 21
ATTITUDE TO PHYSICAL EXERCISE AND HYGIENE

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	26.84	27.00	20.33
Women	26.48	26.42	21.44
17-25 years	26.57	26.52	22.70*
26-35 years	26.46	27.07	18.05*
1. Catholics	26.85	27.84	21.04
2. Orthodox	25.00	25.17	23.20
3. Anglicans	26.26	26.67	17.54
4. Protestants	26.70	25.95	22.67
5. Small Sects	26.32	26.04	20.55
6. Far Eastern	26.33	26.80	12.50
7. Atheists	26.93	26.81	20.24
1. Conservatives	25.61*	25.26	21.23
2. Liberals	26.71	27.21	20.14
3. Socialists	26.29	25.48	20.71
4. Independent and Others	26.96*	26.96	21.93
Average	26.57	26.61	26.67 (Adjusted)
Index numbers	100	100	104

TABLE 22
AESTHETIC VALUE

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	28.79*	28.56*	22.38*
Women	31.02*	32.11*	26.83*
17-25 years	30.46	30.67	26.37
26-35 years	30.15	32.23	22.22
1. Catholics	30.03	29.10	26.98
2. Orthodox	30.03	31.67	22.20
3. Anglicans	30.73	28.56	24.38
4. Protestants	30.29	30.14	24.72
5. Small Sects	30.12	31.69	24.69
6. Far Eastern	32.67	29.80	24.50
7. Atheists	31.64	32.53*	23.81
1. Conservatives	28.89*	29.00*	22.40
2. Liberals	30.54	30.73	24.45
3. Socialists	31.04	31.10	24.40
4. Independent and Others	30.83	31.85	26.49
Average	30.45	30.93	31.75 (Adjusted)
Index numbers	100	101	104

IV. Relationships Between the Variables: Student Types

As was the case in previous studies of teachers and student-teachers, it is clear that certain core variables discriminate between the various categories defined in terms of age, sex, political affiliation, religious beliefs and the nature of the program being embarked upon. The same variables are those which are most closely related to each other in terms of correlation—positive or negative. The most significant of these are as follows: radicalism, punitiveness, formalism, freedom, security, naturalism in education, radicalism in education, uncertainty, aesthetic and religious values. These tend to correlate with each other ± 0.20 or greater.

A factor analysis of the 30 variables over all 739 students tested in the intake reveals eleven factors of significance. Between them they account for 63% of the total variance. These identify not only the nature of the attitudes and values in the group, and the ways in which these cluster together, they also categorize different types of students in the intake. Each of the factors classifies students into bipolar opposites, the characteristic of each type being specified by the size and relationships (positive or negative) of the saturation coefficients.

TABLE 23
SCHOLASTIC VALUE

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	34.57	34.78	27.59
Women	34.20	34.97	28.48
17-25 years	34.24	34.99	29.62*
26-35 years	35.31	34.53	25.55*
1. Catholics	34.41	34.39	28.61
2. Orthodox	34.44	35.17	31.00
3. Anglicans	34.59	36.67	29.00
4. Protestants	34.76	35.31	29.12
5. Small Sects	33.32	34.27	27.55
6. Far Eastern	34.33	36.48	23.00
7. Atheists	34.45	34.72	26.68
1. Conservatives	34.83	35.15	28.27
2. Liberals	34.23	34.68	27.45
3. Socialists	34.10	36.43	27.14
4. Independent and Others	34.18	34.55	29.27
Average	34.29	34.91	35.56 (Adjusted)
Index numbers	100	102	104

The first factor is the *conformism-nonconformism* dimension which appears with monotonous regularity in all groups tested with this instrument, the *Survey of Educational Opinions*. Here the factor accounts for 12% of the variability between individuals (variance) and shows heavy loadings in the ten core variables.

The second factor is a rather narrow *career-orientation* with high positive loadings on all four measures of job satisfaction as well as on formalism, toughmindedness in education, and high negative loadings on freedom and uncertainty. The third factor is recognizable as *altruistic idealism*—high in tendermindedness, response, submission and religious value and with negative loadings in power, utilitarian value, personal development and job satisfaction. The fourth factor is *scholarship* defined by high saturations in scholastic value, stability, introversion, helpfulness and workmanship and negative loadings in anxiety, recognition and response. The fifth factor is a *tough-conservative versus a tender-radicalism* factor. At the radical pole it is characterized by high anxiety, radicalism, tendermindedness, workmanship, naturalism, certainty; the conservative pole is marked by response, submission, uncertainty, physical value, emotional

TABLE 24
RELIGIOUS VALUE

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	27.57	28.31*	20.18
Women	28.06	25.30*	20.75
17-25 years	27.95	26.63*	21.73*
26-35 years	27.38	24.67*	18.47*
1. Catholics	28.32*	28.52*	24.06*
2. Orthodox	29.31*	26.50	22.00
3. Anglicans	27.85	27.44	20.80
4. Protestants	27.46	25.76	20.04
5. Small Sects	29.72*	27.50	22.38
6. Far Eastern	29.00	25.20	23.50
7. Atheists	25.25	24.96*	16.98*
1. Conservatives	28.96*	28.70*	20.77
2. Liberals	27.88	26.40	19.16
3. Socialists	28.38	24.29*	20.33
4. Independent and Others	27.36*	25.87	22.19
Average	27.93	26.30	20.49* (Adjusted)
Index numbers	100	94	95

satisfaction from being with children, professional development and job satisfaction. The sixth factor can be identified as an *experimentalism* which is rooted in traditional values. The factor has high loadings on experience, scholastic values, certainty, extraversion and formalism, with negative loadings in power, submission, religious and utilitarian values. The seventh factor is anxious religious idealism, perhaps better characterized as an *anxious fundamentalism*. The saturations are positive here for anxiety, workmanship, uncertainty, aesthetic and religious value, and negative for radicalism, submission, naturalism, physical exercise and utilitarian value. The eighth factor is *dependent submissiveness*. It is defined by high positive loadings in neuroticism, submission, utilitarian value and negative loadings in workmanship, physical exercise. This factor may simply be identifying the group of physical education types in the sample and contrasting them with an anti-physical group. The next two factors both refer to the personality make-up of the students. The ninth factor is a *stable-introversion versus neurotic-extraversion* dimension. The positive loadings are here in the variables anxiety, extraversion, neuroticism, security, scholastic value; the negative loadings are in punitiveness, power, radicalism in education, aesthetic value, personal development. The tenth

TABLE 25
UTILITARIAN VALUE

	B.Ed. Students	P.D.A.D. Students	Graduate Students
n =	562	177	218
Men	22.42*	22.68	14.88
Women	20.54*	21.70	15.90
17-25 years	20.98	22.09	16.97*
26.35 years	22.00	21.73	12.93*
1. Catholics	20.69	20.68	15.51
2. Orthodox	21.25	21.83	19.20
3. Anglicans	21.29	21.89	14.00
4. Protestants	20.95	22.67	17.17
5. Small Sects	20.66	20.77	14.45
6. Far Eastern	22.83	21.60	11.00
7. Atheists	21.82	22.93	14.38
1. Conservatives	22.18	21.93	15.87
2. Liberals	20.79	21.55	14.72
3. Socialists	20.74	22.52	14.43
4. Independent and Others	20.85	22.36	16.67
Average	21.02	22.03	19.60 (Adjusted)
Index numbers	100	105	93

factor contrasts *stable-extraversion versus neurotic introversion*. High positive loadings are here in anxiety, introversion, neuroticism, punitiveness, freedom, security; the negative loadings are in recognition, response and religious value. The eleventh and final factor can be identified as an *anxious individualism*. High positive loadings are found in anxiety, freedom and religious value; negative loadings are in submission, workmanship and emotional satisfaction.

Bibliographical Note

Full details of the instrument used in testing, norms for comparable populations and data on validity and reliability are available in the sources noted below. Copies of these reports are available from the author.

McLeish, J. *Teachers' Attitudes: A Study of National and Other Differences*. Cambridge, 1969.

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REVIEWS

COGNITIVE PROCESSES IN EDUCATION: A PSYCHOLOGICAL PREPARATION FOR TEACHING AND CURRICULUM DEVELOPMENT

by Sylvia Farnham-Diggory

New York, Harper & Row, 1972, pp. xxxiv & 630, \$14.00.

While the idea of "educational psychology" has been bandied about for a good many years, there have been remarkably few instances of really good integrations of these two cultures. Far too many of the texts that have been labelled educational psychology have been anything but! They have been either educational in orientation, with an implicit Sunday supplement understanding of psychology, or psychological in orientation, with "obvious" statements made about education. Professor Farnham-Diggory manages to avoid these pitfalls and still do justice to the science of psychology and to the real world of education.

The basic premise is that good schools can be built on theoretically sound principles of psychology. The relevant principles according to the author are those of Bruner, Piaget, Werner and Robert White. In other words, this text is thoroughly "developmental" and "cognitive" in orientation—"learning theory" has no prominent place in its pages—and can best be seen as an attempt to provide teachers and curriculum planners with those psychological principles that would be of most help to them in the solution of their pedagogical problems.

To facilitate this effort, the author divides the principles into six major categories and these form the first six parts of the text: (1) basic cognitive development; (2) basic system of information processing; (3) motivation, personality and culture; (4) language; (5) reading and mathematical thinking; and (6) creative thinking. This is no grab-bag of cursorily surveyed common fare. The author has been judiciously selective in the choice of material. She uses those principles of cognitive psychology that are scientifically reliable and builds each part upon materials previously explained—the result is a book which has a constant cognitive theme throughout, and which is presented as an integrated whole. Each part has its own introduction, chapters and subsections emphasizing different aspects of the material, and a summary. It should also be re-emphasized, that whichever aspect of the material is being examined—basic sensorimotor development, basic systems of information processing, the emergence of symbolic thinking, programmes for organizing information, I.Q., competence and achievement, self-motivating learning cycles, group dynamics of the classroom, language and cognition, the role of the unconscious in the creative process, memory (there are many more)—the author is always concerned with classroom relevancy. This is especially evident in the seventh and concluding part. Here, the significant issues of the first six parts are incorporated into the design of an open school and pre-primary programme. The author does not attempt to offer a prescription that will solve all pedagogical problems; rather, she presents a way of looking at these

problems—a heuristic device, based on choice principles of cognitive psychology. She notes in the introduction that “these principles should help one to formulate the solution to one’s own pedagogical problems. But the final solution—and it should always be a temporary, dynamic one—must be a product of one’s own tests and revisions”. This book is worth reading, if for no other reason than to see what is possible when learned psychology and education come together and design a school.

Two further points. First, the part on language is very well done. The full range of topics found in most general texts on psycholinguistics is succinctly described and analyzed. This part could be incorporated readily into an intermediate level reader on that topic. Second, a *Study Guide* accompanies the text which it parallels in format. Each part contains programmed items, a do-it-yourself glossary, sample objective tests, matching items, questions for discussion, and small projects or experiments. Unfortunately, the guide is not of the same calibre as the text. Many of the questions and issues raised are perfunctory, neither challenging the reader nor rendering the text more understandable.

I have two criticisms of the text itself. First, it tends to be too esoteric in certain key places. The author apparently assumes that her readers are steeped in the cognitive tradition in psychology, therefore elaborate explanations of “everyday” basics would not be necessary. For example, a profound and complex concept such as Werner’s principle of *progressive differentiation and hierarchic integration* is briefly described on a single page. Yet this principle is cited throughout the text as if no further explanation were necessary, and its significance and import were general knowledge. In the same manner, certain fundamentals of Piaget’s and White’s views are presented. All of which means that, in certain instances, the basic themes of the text have to be supplemented by reference to other sources, which may or may not be so bad; but in any case, for the beginning student, the text cannot be readily understood.

My second criticism concerns things editorial. Bibliographical details are not always accurately cited. This is not a major issue. However, the uninitiated could have difficulty checking original sources.

Neither of these criticisms detracts from my overall impression of this book—it is at once bold, learned, and original. I concur with Jerome Bruner’s statement in the foreward: “This book represents a new departure in educational psychology”. *Cognitive Processes in Education* should appeal to the tyro and to the expert as well.

BRUCE BAIN

